VOL. 12, No. 9 SEPTEMBER 1958

CHRONICLE OF THE WORLD HEALTH ORGANIZATION

CONTENTS

	Page
Neurotropic virus diseases	291
Untoward reactions to penicillin	295
The first physiotherapy school in South-East Asia	302
Decentralization of international health work in the Americas: Zone II	304
Poliomyelitis survey in Guatemala	306
Colombia: a comprehensive international health programme	308
The price of malaria eradication in the Americas	309
Plan for leprosy control in Paraguay	312
Notes and News	
Public health training for foreign students	314
Courses in public health dentistry	314
Histological definitions of cancer types	315
Water-supplies in the Eastern Mediterranean Region	316
Smallpox epidemic in Pakistan	317
Malaria conference in Bucharest	317
Recommended requirements for poliomyelitis vaccine	317
Expert Committee on Auxiliary Dental Personnel	318
Post-graduate nursing courses in Indonesia	318
Preparation of a new batch of tuberculin for vaccination campaigns	318
Malaria control in Africa	319
People and places	319
Review of WHO Publications	320

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names are distinguished by initial capital letters.

PRINTED IN SWITZERLAND

NEUROTROPIC VIRUS DISEASES

Virus research has been proceeding at a great pace during the past ten years. The development of vaccines against poliomyelitis has been the most spectacular result of this work, but other discoveries have been made which may prove in the long run to be no less important. Two large groups of viruses—the Coxsackie viruses and the ECHO viruses [1]—have been isolated from the human intestinal tract, and many of them have been shown to cause diseases resembling " non-paralytic poliomyelitis " for which the collective term " aseptic meningitis syndrome " has been proposed. These and other diseases caused by neurotropic viruses present a growing problem in Europe. The WHO Regional Office for Europe therefore decided to convene an Advisory Group to examine the present situation and make recommendations for the control of these diseases. The Group, which met in Copenhagen from 14 to 19 April 1958, comprised experts from 14 countries.

Reporting of cases

Many countries do not have reliable data on the incidence of neurotropic virus diseases, and even in the case of poliomyelitis underreporting is general. From evidence recently accumulated, it was concluded that the true incidence of paralytic poliomyelitis in some countries may be ten times as high as the reported incidence. For epidemiological purposes, a break-down by age-groups, geographical distribution, and type of poliovirus is essential.

It was also pointed out that each year a new group of cases of permanent paralysis is added to the large residue from previous epidemics, so that the medical, social and economic consequences are cumulative. The Group recommended that studies should be made to evaluate this cumulative effect in order to obtain a better picture of the true importance of poliomyelitis. They also agreed with the recommendations contained in the second report of the Expert Committee on Poliomyelitis [2] to the effect that only cases with paralysis as defined in the report should be reported as poliomyelitis and that the term " non-paralytic poliomyelitis " should be replaced by " aseptic meningitis syndrome ", qualified by specification of the etiological agent, where known.[3]

Poliomyelitis vaccination

In view of the known periodicity of poliomyelitis epidemics, the Group felt that it was still too early to assess the true significance of the drop in the incidence of poliomyelitis that had followed large-scale vaccination campaigns in some countries. At the same time, it was agreed that the results so far were sufficiently encouraging to justify introducing or continuing these measures in countries where poliomyelitis is of significant public health importance. Before embarking on an expensive vaccination programme, however, precise epidemiological information should be available and public health authorities should weigh the cost and the results likely to be achieved against other demands on their resources.

The Group considered that there were distinct advantages in establishing a national laboratory for the production of poliomyelitis vaccine, but pointed out that this required a scientific staff with skill and long experience. The initial cost of establishing a laboratory is therefore likely to be high. On the other hand, some countries had found it more economical to manufacture the vaccine locally than to import it, and once the facilities had been provided they could perhaps be used later for the production of

[1] Enteric cytopathogenic human orphan viruses

[2] *Wld Hlth Org. techn. Rep. Ser.*, 1958, **145**

[3] See also *Chron. Wld Hlth Org.*, 1958, **12**, 147.

other virus vaccines, such as influenza, mumps, adenovirus, ECHO virus, and perhaps measles.

Of the various methods of production of poliomyelitis vaccine at present in use, no one method could be singled out as preferential, and further studies are needed. Particular attention should be given to the question of preventing losses among the monkeys. It is not rare for losses of up to 60% to occur. Another serious problem is the risk of animal attendants becoming infected with monkey pathogens, especially tuberculosis and B virus. Nearly all infections with the latter have proved fatal. It was suggested that the data obtained in studies on these problems should be circulated to all laboratories working in this field.

Although there have been very few accidents following the use of poliomyelitis vaccines, small errors in the application of safety measures can have much more serious consequences than similar errors in the production of other vaccines. It was noted that the Expert Committee on Biological Standardization had made proposals regarding the establishment of international reference sera and an international reference vaccine,[4] and that WHO would shortly be convening a Study Group on Recommended Requirements for Poliomyelitis Vaccine.[5] The suggestion was made that an internationally recognized testing laboratory would facilitate international traffic in poliomyelitis vaccine, by obviating the need for countries to re-test imported vaccine, and could also provide assistance to laboratories experiencing production difficulties. Serious and unpredictable difficulties have been encountered from time to time by almost all laboratories undertaking large-scale production, and the possibility of delays must be taken into account when planning vaccination programmes.

Live poliovirus vaccines

Some studies which have been made with live vaccines have given very promising results, but there is not yet sufficient information available to permit the use of these vaccines in public health programmes. It is known that orally administered vaccine virus is excreted in the stools, and all the strains so far tested have shown a tendency to revert to increased intraspinal or intracerebral activity in monkeys after human passage. It is not yet established, however, what this change means in terms of the danger of infection of the nervous system in humans after oral administration. The Group suggested four ways in which this problem might be approached :

1. The natural circulation of attenuated virus among humans could be studied in relatively isolated communities or in children in institutions. This would eliminate intermediate laboratory procedures and the extent of reversion to intracerebral pathogenicity for the monkey on natural human passage could be determined.

2. The vaccine virus could be passed serially through humans who had previously been successfully immunized with potent inactivated virus. In this way, any increase in virulence of the live vaccine could be safely observed.

3. The stability of the strain could be tested by passage in tissue culture or in laboratory animals. Any increase in intracerebral pathogenicity would suggest that the strain was unstable and not suitable for large-scale use in man.

4. The value of monkey pathogenicity tests as an aid to the selection of live virus vaccine strains might be checked by making a systematic study of the monkey virulence of strains isolated from paralytic cases.

Although it is not possible at the present time to indicate a preference for any particular strain for field study, there appears to be some evidence that strains which grow best in alkaline tissue-culture media show a lower intracerebral activity in the monkey than those growing equally well in more acid media. It would therefore be advisable to concentrate on the use of such strains.

[4] *Wld Hlth Org. techn. Rep. Ser.*, 1958, **147**

[5] See page 317 of this number of the Chronicle.

ECHO and Coxsackie viruses

Recent observations suggest that the ECHO group of viruses is playing an increasing role in causing epidemics of aseptic meningitis. Up to the present 20 serological types have been identified. The significance of the various types as etiological agents has not yet been thoroughly elucidated, but most of the well-defined epidemics were due to type 9 and a few to types 4 and 6. Many types have been isolated only from healthy persons. On the other hand, ECHO viruses have been found in some paralytic patients from whom no poliomyelitis virus could be isolated.

The Coxsackie group of viruses appears to be capable of causing quite a number of diseases, including herpangina, aseptic meningitis, pleurodynia (Bornholm disease) and infantile myocarditis, as well as some forms of febrile pharyngeal or gastro-intestinal disease. Though it is difficult to assess the public health importance of these diseases, some of the epidemics that have occurred have caused considerable inconvenience and loss of man-hours.

The Group suggested that WHO might study the possibilities for the production and exchange of sera and type strains among national public health laboratories, as specific type diagnosis is very important from an epidemiological point of view.

Tick-borne encephalitis

This disease has now been reported from Austria, Bulgaria, Czechoslovakia, Finland, Germany, Great Britain, Hungary, Poland, Sweden, the USSR, and Yugoslavia. In some of the eastern countries, an incidence of up to 3 per 100 000 has been reported, with a lethality as high as 25%. In the endemic areas of Europe, the incidence may exceed 20 per 100 000 in some years, but the disease is much less lethal and paralysis is rare. The incidence depends mainly upon the possibilities of contact between the population and infected ticks, although big local outbreaks have also been caused by the consumption of raw milk from infected goats.

Tick-borne encephalitis can be diagnosed either by complement-fixation tests or by virus neutralization tests. The complement-fixation test remains positive only for a limited period after infection, whereas the neutralization test still gives a positive reaction after several years. All strains of virus isolated from tick-borne encephalitis have shown a close antigenic relationship with one another and also with the virus of louping ill in sheep. The Group felt it desirable that studies should be continued on the antigenic relationship between strains of tick-borne encephalitis isolated in various countries; and it suggested that WHO should arrange for the establishment of one or more international standard sera for use in virus neutralization tests, for measuring the potency of therapeutic sera, and possibly for use in complement-fixation tests.

Anti-tick campaigns have been carried out in some areas as a means of controlling the disease. Prophylactic immunization with formolized mouse-brain vaccine has also been used successfully, especially in the USSR. The Group strongly recommended that laboratory personnel should be vaccinated, as many infections have been acquired during work on tick-borne encephalitis virus. The possibility of using less pathogenic strains for routine laboratory studies should also be examined, and work on improving methods of vaccine production should be continued.

Other neurotropic viruses

Although the terms of reference of the Advisory Group were limited to enteroviruses and the virus of tick-borne encephalitis, certain other viruses which may cause aseptic meningitis or even encephalitis were also discussed briefly. Mumps virus is a frequent cause of aseptic meningitis in Europe, and lymphocytic choriomeningitis is endemic in some areas where contact with infected rodents is common. Herpes virus is a rare cause of aseptic meningitis, and in some countries leptospira are often associated with this disease. Encephalomyocarditis is not considered to be of any importance in Europe.

There have been reports from Czechoslovakia of infection in man and animals with equine encephalitis virus. In view of the epidemiological importance of these findings, it was recommended that further research should be carried out to confirm the presence of these viruses in Europe.

Laboratory diagnosis of neurotropic virus diseases

The Group recognized that specific laboratory diagnosis of virus diseases is often of little help to the individual patient, but emphasized that it is nevertheless important for public health authorities to be informed of the prevalent etiological agents so that they can adopt appropriate prophylactic measures. Such information is also required in connexion with epidemiological surveys, and it enables communicable diseases to be reported more accurately. Furthermore, virus diagnostic laboratories can help in evaluating the effect of specific control measures, such as vaccination. In general, the laboratories should be in close relationship both to the public health laboratory services, of which they may be a part, and to the major treatment centres for infectious diseases. But in view of the complicated facilities and specialized personnel required, it is advisable to have relatively few laboratories located in the big population centres, rather than a large number of small laboratories scattered throughout the country.

For the diagnosis of infections with enteroviruses, serological tests alone have been found unsatisfactory. It is therefore necessary to have equipment for tissue-culture work and a satisfactory supply of experimental animals, so that the virus can be isolated and identified. Serological tests have been found of considerable value, however, for the diagnosis of other virus infections, such as mumps, tick-borne encephalitis, and lymphocytic choriomeningitis.

During recent years, rapid advances have been made in laboratory techniques and a number of viruses responsible for diseases of the central nervous system have been identified. Nevertheless the Group stressed the fact that the etiology of a considerable proportion of cases is still unknown ; and it can be anticipated that the ecological changes associated with the continual rise in living standards may result in the appearance of yet other diseases due to neurotropic viruses.

Arrangements for vaccination against yellow fever

The International Sanitary Regulations specify that an international certificate of vaccination against yellow fever is valid only if the vaccine used has been approved by the World Health Organization and if the vaccinating centre has been designated by the health administration for the territory in which it is situated.

A supplement to a recent number of the WHO *Weekly Epidemiological Record* (No. 25, 1958, Supp. 3) reviews arrangements for vaccination against yellow fever in some 120 countries and territories, as on 20 June 1958, listing designated vaccinating centres and institutes manufacturing yellow fever vaccines approved by WHO.

UNTOWARD REACTIONS TO PENICILLIN

World production of penicillin is now sufficient to provide more than 250 million courses of treatment annually. Against this staggering total, the number of severe reactions reported remains exceedingly small. Yet it is important that all users of penicillin should be fully aware of the reactions that may occur and of the precautions that should be taken to keep the risks to a minimum. With the aim of providing public health authorities with a readily accessible body of data on which to base their policies, WHO has undertaken a study of these questions, the first results of which form the subject of this article.

" Penicillin is the queen of drugs. It is the most satisfactory weapon known in that it does its particular task with utmost efficiency and negligible harm." This opinion was expressed in 1954 in an American textbook of pharmacology.[1] Can it still be upheld in view of the increasing number of severe and fatal reactions reported in the medical literature? The answer is of vital importance to public health programmes, for penicillin has undoubtedly become the key drug in the control of a wide range of communicable diseases. WHO has a special interest in this question, for the campaigns against treponematosis which it is sponsoring, and which involve millions of people in many parts of the world, would be impossible without penicillin. In December 1956, a questionnaire on the incidence of penicillin reactions was sent to members of the WHO Advisory Panel on Venereal Diseases and Treponematoses, and earlier this year an analysis of the answers was published in the WHO Bulletin.[2] The same number of the Bulletin also contained a report on penicillin-sensitivity reactions in Taiwan.[3] Following up these studies, a comprehensive review of the literature has now been undertaken by T. Guthe, O. Idsöe and R. R. Willcox.[4] It is on this review that the following discussion is mainly based.

The picture in outline

Penicillin came into general use in 1943, but the first death from penicillin therapy was not reported until 1946, and another three years elapsed before a second fatality occurred. During the past ten years, however, severe reactions have been reported with increasing frequency, and the number of fatal cases has multiplied rapidly. By 1955 some 560 anaphylactic reactions had been reported, 81 of them fatal, and by 1957 it was estimated that some 1000 deaths from anaphylaxis due to penicillin had occurred in the United States of America alone. To obtain a true picture, however, these figures must be set beside the phenomenal increase in the consumption of penicillin that has taken place during the past 15 years. In 1943, the first year of commercial production in the United States of America, only 29 pounds of crude penicillin were produced, whereas by 1955 the world production of penicillin exceeded 500 tons a year—enough to provide 250 million courses of treatment of 3 million units each.

The increasing frequency with which reactions have been reported in recent years is thus seen to be largely a natural consequence of the vast scale on which penicillin is now being used. Indeed, it is the general absence

[1] Drill, V. A. (1954) *Pharmacology in medicine : a collaborative textbook*, New York

[2] Willcox, R. R. (1958) *Bull. Wld Hlth Org.*, **18**, 457

[3] Idsöe, O. & Wang, K. Y. (1958) *Bull. Wld Hlth Org.*, **18**, 323

[4] Guthe, T., Idsöe, O. & Willcox, R. R. (1958) *Bull. Wld Hlth Org.*, **19**, (In press)

of untoward reactions that has encouraged such lavish use of penicillin. Unfortunately, it has also encouraged its indiscriminate use. Penicillin has been widely prescribed for all kinds of minor infections, and for conditions in which it is ineffective or not more effective than other drugs; and since it can be bought without prescription, self-medication is common. Severe reactions occur only in patients sensitized by previous exposure to the drug, and it is known that many of the fatalities that have occurred following the legitimate use of penicillin have been attributable to previous unnecessary medication. Naturally, the chances of a patient having had previous treatment with penicillin are today much greater than they were 10 or 15 years ago.

These are the main features of the present situation. In order to analyse it further, it is necessary to examine in some detail the nature of the reactions that may result from penicillin administration.

Types of reaction to penicillin

In common with most other drugs, penicillin can produce various types of untoward reaction. These are often referred to collectively as "toxic reactions", but strictly speaking this term should be reserved for quantitative, pharmacological effects experienced by every person receiving a sufficiently large dose of the drug, i.e., for effects which are inherent in the nature of the substance and the severity of which is a function of the dose.

Most modern chemotherapeutic agents have a low toxicity in relation to the therapeutic dose, and penicillin is an outstanding example of this. But these drugs can produce reactions of a different kind, by virtue of the fact that they are potential antigens; repeated administration may produce sensitization in the patient, leading to allergic skin reactions or anaphylactic shock. The majority of the reactions to antibiotics in general, and to penicillin in particular, are produced by this mechanism.

Antibacterial drugs can also produce undesirable reactions by interference with the metabolism of the microbial flora. This can result in superinfection and cross-infection by organisms less affected by the drug than others, or in a temporary exacerbation of symptoms due to the release of noxious substances following microbial lysis. A more serious problem is the development of resistance in the organism against which the drug is being used.

Local and systemic toxic reactions

On the whole, local toxicity to penicillin has not presented an appreciable problem. The early amorphous preparations of penicillin sometimes produced thrombophlebitis when given intravenously, or pain and cellulitis on intramuscular or subcutaneous administration; and penicillin in oil-beeswax, used between 1945 and 1948, often caused local reactions of an allergic nature. Since the introduction of procaine penicillin with aluminium monostearate (PAM), however, local reactions have virtually ceased. The more recently introduced benzathine penicillin—a particularly long-acting preparation—was at first found to cause pain on injection, but improved preparations have largely overcome this difficulty.

The acute toxicity of the various penicillin salts in animals is very low. Mild systemic toxic reactions were sometimes experienced with the early preparations, owing to the presence of impurities, but such reactions are practically unknown with the highly purified preparations now in use. It has been calculated that for a 70-kg man, the LD_{50} of sodium penicillin would be more than 150 million units—a dose far in excess of what it would be practical to give. There have been isolated reports of damage to the central nervous system, peripheral neuritis, and transient psychosis following intramuscular injection. The pathogenesis of these reactions is unclear, however, and it is by no means certain that they are true toxic reactions. In any event, they are exceedingly rare. In contrast to the sulfonamides and many other drugs, penicillin does not cause damage to the bone marrow or haemopoietic system, and it can be safely given in severe anaemia. Intrathecal administration of peni-

cillin causes meningeal irritation and serious complications have been reported, but this route of administration is seldom used today. It seems justifiable to conclude that " the toxic effects of penicillin in man are, in the broad run of events, negligible. They certainly have detracted little from the use and usefulness of penicillin in clinical practice and public health programmes."

Allergic skin reactions

As already mentioned, allergic reactions differ from true toxic reactions in that they are not inherent in the pharmacological nature of the drug, but are due to a hypersensitivity, or altered reactivity, of the patient, usually the result of previous exposure to the drug or a related substance. Moreover, the severity of such reactions is independent of the quantity of drug administered, and they can be produced even by minute doses.

It seems that penicillin can evoke the production of two types of antibody: a skin-sensitizing antibody and an antibody responsible for anaphylactic reactions. The skin-sensitizing antibodies may produce either an eczematous reaction or an urticarial response. The most frequent form of eczema is contact dermatitis caused by local application of penicillin in the form of ointment or solution, or by prolonged handling of the drug, as in doctors and nurses. Estimates of the frequency of contact dermatitis vary from 4% to 10% of persons exposed to contact with the drug over long periods. It is therefore advisable to avoid local applications of penicillin wherever possible, and in any case not to continue treatment for more than three to five days. Desensitization is sometimes of value for doctors and nurses.

Another form of eczema can be caused by parenteral administration of penicillin, or by its inhalation. The eruptions are of the erythematovesicular type, resembling those caused by fungal infections (trichophytosis and epidermophytosis), and are characteristically localized to the groins, the interdigital spaces, and the palms and soles. It has been suggested that a previous fungus infection may result in cross-sensitivity to penicillin, as it appears that such reactions may occur in persons not previously exposed to the drug.

Both types of eczematous reaction usually subside rapidly when penicillin is stopped and appropriate treatment given. Topical application of hydro-cortisone may be of value in prolonged cases. It is rare for generalized eruptions or exfoliative dermatitis to develop. If they do they are generally of a mild type, although serious complications, such as anuria, have been reported, and exfoliative dermatitis may occasionally become haemorrhagic and gangrenous.

" Serum-sickness-like penicillin reactions " is a collective term which has been proposed to describe a group of allergic reactions comprising urticaria, angioneurotic oedema, joint pains, inflammation of the lymph glands, fever, and other manifestations similar to those seen in serum sickness. Such reactions usually follow injections of penicillin, but can also occur after other forms of administration. They may appear within 30 minutes or only after several weeks. With modern preparations of penicillin, such as PAM, it has been estimated that serum-sickness-like reactions occur in 1-2% of all patients receiving the drug. Children appear to be less likely to develop such reactions than adults. Serum-sickness-like reactions are not usually dangerous, but very rarely severe and even fatal complications may develop, such as laryngeal oedema, periarteritis nodosum, purpuric lesions, or cardiovascular collapse. ACTH or cortisone may be life-saving in such cases. Mild reactions usually subside spontaneously within a few days or weeks when penicillin treatment is stopped. The antihistamines may be effective in severe or prolonged cases, but are of no value prophylactically, although an antihistamine-penicillin salt recently introduced has been claimed to obviate allergic reactions in persons sensitive to penicillin. The use of the enzyme penicillinase in cases of urticaria and angioneurotic oedema resistant to other methods is another recent development that has given promising results.

All forms of skin sensitivity to penicillin are usually transient, declining gradually

over a period of 6-12 months. Nevertheless, treatment with penicillin should be avoided if possible in patients with a past history of skin reactions, since the symptoms may recur, and the possibility of systemic rather than skin sensitization has to be kept in mind.

Anaphylactic reactions

As already indicated, allergic skin reactions to penicillin rarely constitute a danger to life; most of the fatalities that have been reported have been due to reactions of the anaphylactic type. Since such reactions are only known to occur in persons sensitized by previous exposure to the antibiotic, they were exceedingly rare during the first few years of penicillin therapy.

It is difficult to make an accurate assessment of the frequency with which anaphylactic reactions occur, as only a small proportion of them are reported in the literature, even if they end fatally. The greatest number of reports comes from the United States of America, which consumes about three-fifths of the total world production of penicillin, and a survey described by Welch et al. in 1957 [5] throws some light on the frequency of anaphylactic reactions in that country. In the 827 hospitals covered by the survey, there were 2500 penicillin reactions during the three years 1954-56. Of these, about 793 were of the anaphylactic type and 72 were fatal. Since the three-year survey covered one-third of the hospitals in the United States, these figures can be considered to correspond to the annual rates for the whole country. During the same period about 200 tons of penicillin a year were used for human medicine in the United States. This is enough to provide some 300 million injections, so that there were about 25 anaphylactic reactions and 2-3 deaths for every 10 million injections given. An estimate for Denmark, based on statistics for the years 1951-55, also arrived at a figure of 3 deaths per 10 million injections.

The importance of previous exposure to penicillin is exemplified by the fact that in the mass campaigns against the treponematoses among populations not previously exposed to penicillin, several million people have received penicillin injections without anaphylactic reactions having been reported. On the other hand, in Taiwan, where the consumption of penicillin is very heavy (nearly 500 000 units per person per year), there were 74 anaphylactic reactions, including 12 deaths, between 1951 and 1955. For the same reason, anaphylactic reactions are more common in urban than in rural areas. Occasionally, a negative history of previous penicillin administration is obtained, but this can be misleading, as local applications, inhalations, etc. are not always remembered. Serious and even fatal reactions have repeatedly been reported in patients who have previously used penicillin tablets, lozenges, spray, antral instillations, and ointment. Exceedingly small quantities of penicillin seem capable of causing sensitization in susceptible persons. In one of the fatal cases reported from Taiwan, sensitization appeared to have been induced by a single tablet of 50 000 units taken one year previously. Most of the patients, however, had previously been exposed to amounts between 0.6 and 4.8 mega-units.

The time interval between the administration of penicillin causing the anaphylactic reaction and the last previous administration can vary widely. Intervals as short as ten days and as long as eight years have been reported. The length of the interval does not appear to bear any constant relation to the severity of the reaction, which probably depends more on individual factors. It should be noted that in a sensitized patient the first subsequent administration of penicillin will bring on a reaction. Consequently, if a patient is given penicillin and no reaction occurs, it can be assumed that further administrations in the same series will be without danger, provided that the intervals between the doses are not longer than four days. From this it follows that short courses of treatment with high single doses are preferable to longer courses with smaller doses.

[5] Welch, H. et al. (1957) *Antibiot. Med.*, 4, 800

The type of penicillin preparation used does not appear to be important. Skin tests indicate that the common penicillin preparations are immunologically equivalent, and this is supported by clinical experience. Although most of the reactions reported have occurred with procaine-penicillin preparations, this merely reflects the fact that it is this type of preparation which is generally used; many authors have stated that procaine is unlikely to induce sensitivity, and in two cases in which aqueous penicillin was substituted because of suspected sensitivity to the procaine component, the patients died.

It seems, then, that the way in which a sensitized person will react to a subsequent exposure to penicillin is dependent largely on personal, constitutional factors. Little is known as yet about the nature of these personal factors. The reactions occur most commonly in adults between 20 and 49 years of age, but they appear to be equally distributed between the two sexes. They are rare in children under 12 years old, and the frequency decreases rapidly with increasing age after 50. Children treated with penicillin are, of course, less likely to have had a previous exposure to the drug than older persons, but there is also some evidence that they are less easily sensitized. In the older age-groups, the consumption of penicillin is presumably lower than in younger adults, but it may also be that desensitization takes place in the course of time.

It does seem well established, however, that patients with a personal or family history of allergy are more easily sensitized than others, and that they react more severely to subsequent treatment; great caution should therefore be observed if re-treatment with penicillin is indicated in such patients.

Changes in the microbial flora

Of the various changes in the microbial flora brought about by the administration of penicillin, the one which has caused most concern so far is the development of resistance in staphylococci. Some organisms, such as *Escherichia coli*, show a natural resistance to penicillin, but acquired resistance has not presented a problem as yet in other than staphylococcal infections. In some studies, 50-70% of hospital patients have been found to carry antibiotic-resistant staphylococci, the type of resistance depending upon the antibiotic in current favour. Cases of complete resistance to all antibiotics have been reported. Resistant staphylococci can cause superinfection in a patient being treated with the antibiotic, or cross-infection in other patients in the same ward. The main problem has been created by staphylococcal pneumonias and urinary and wound infections. Staphylococcal enteritis may sometimes occur as the result of superinfection of the bowel with penicillin-resistant organisms from the mouth or throat, but this complication is more common with orally administered antibiotics, such as the tetracyclines.

The resistant organisms are spread by dust from clothing and bedclothes, or by hospital personnel who acquire resistant strains from penicillin-treated patients. It has been shown that the proportion of nasal carriers among student nurses entering hospital may increase in one month from around 5% to as much as 50%. Precautions which should be taken in hospital to prevent cross-infection include such measures as isolation of staphylococcal cases and carriers, barrier nursing, and the wearing of masks by hospital staff. The development of resistant strains can be minimized by restricting the use of penicillin—and, indeed, of all antibiotics—to cases where they are absolutely necessary, and by giving sufficiently large doses at the beginning of treatment to kill the organisms rapidly.

Fortunately, the acquired resistance of the staphylococci is usually lost again fairly rapidly when they are diluted with non-resistant strains in the general population, and, outside hospital, resistance has so far not been encountered on a serious scale. It has recently been reported, however, that the percentage of nasal carriers of staphylococci among blood donors in Australia was twice as high in 1955 as in 1954, and the situation must therefore be watched carefully.

Among organisms other than staphylococci which may cause superinfection during penicillin therapy, as a result either of resistance or of decreased competition, mention may be made of *Escherichia coli* and of paracolon and proteus bacilli. Overgrowth with *Candida albicans* is more common after the orally administered tetracycline antibiotics than after parenterally administered penicillin, but cases of moniliasis have been reported, usually in the mouth. It has been suggested that the " broad spectrum " approach, in which penicillin is combined with other antibiotics, may actually increase the risk of superinfection by all types of organism.

In the treatment of syphilis with penicillin, a Herxheimer type of reaction frequently occurs. This phenomenon, also known as " therapeutic shock ", is generally attributed to the release of noxious substances by the spirochaetes killed by the drug. In early acquired syphilis, it occurs in 80-90% of patients. The reaction is usually mild in such cases, and there is no need to discontinue therapy, but severe and even fatal reactions may occur in late neurosyphilis, cardiovascular syphilis, and gummatous syphilis, as well as in debilitated babies.

Like other antibiotics, penicillin may sometimes cause deficiency syndromes due to disturbance of the metabolic processes in the gastro-intestinal tract and interference with the production of the vitamin B complex and vitamin K. It is believed that the symptoms, which include black tongue and lesions of the oral mucosae, are due in part to an overgrowth of pathogenic flora.

Precautionary measures

The frequency of severe reactions to penicillin can be greatly reduced by taking a number of simple precautions, and it should be possible to eliminate fatalities almost entirely if the physician giving the injection always has at hand the necessary drugs to deal with an emergency. Before administering penicillin, the patient should be questioned carefully regarding previous exposure to the drug and any manifestations of an allergic diathesis in himself or his family. Full details of previous treatment should be noted and if a reaction occurred, renewed treatment with penicillin should be regarded as contra-indicated. Even mild reactions, such as itching, a tingling feeling in the tongue or fingers, a peculiar taste in the mouth, dizziness, or slight fever, should be taken as an indication of the probable presence of anaphylactic sensitivity, precluding re-exposure to any type of penicillin preparation. An exception is the delayed type of serum-sickness-like reaction, which does not appear to be a usual precursor of anaphylaxis.

There is clear evidence that patients with a history of asthma, hay fever, rhinitis, or other allergic diseases react more easily and more severely than others. Bronchial asthma, in particular, appears to increase considerably the risk of severe anaphylactic reactions in penicillin-sensitized patients, and an asthmatic patient should not be treated with penicillin if this can possibly be avoided. As an additional precaution, a skin test can be performed, but patch tests appear to be of little value, except in contact dermatitis. On the other hand, the immediate intradermal test, although usually positive in cases of anaphylaxis, may itself produce a severe anaphylactic reaction. Moreover, a negative test does not necessarily exclude penicillin sensitivity. Routine skin testing is probably not a practical procedure for all patients, but might be considered before treatment of persons who routinely handle penicillin.

Penicillin should be injected slowly by the intramuscular route, and the patient watched carefully during the injection for any signs of a reaction. Some authors favour giving the injection in one of the upper arms rather than in the buttock, so that a tourniquet can be applied if a reaction commences, but the efficacy of this procedure is doubtful. If possible, the patient should be allowed to remain in the consulting room for about 15 minutes after the injection. Adrenaline (1:1000) should be to hand for immediate injection if anaphylactic symptoms appear; if subcutaneous injection is ineffective, it may be given intravenously, or even directly into the heart. An antihistamine, such as diphenhydramine hydrochloride or tripelennamine,

should also be given, and aminophyllin has been recommended by some authors in cases of respiratory distress. These drugs, together with the appropriate syringes, should always be carried by a doctor giving injections of penicillin. In clinics oxygen should also be available, as well as a drip-infusion set; continuous drip-infusion of *l*-arterenol or plasma has been recommended in cases of prolonged depression of the blood-pressure. Intravenous cortisone or intramuscular ACTH is also indicated in protracted cases. Recently it has been shown that penicillinase, an enzyme that inactivates penicillin, is capable of clearing the circulating antibodies from the blood. Given simultaneously, 5000 units will completely inactivate 100 000 units of crystalline penicillin. This enzyme may prove of great value in the future for arresting anaphylactic shock. The recommended dose is 800 000 units intravenously, followed by 800 000 units intramuscularly.

Conclusions

From the data at present available, it may be concluded that the inherent toxicity of penicillin is so low as to be of negligible importance, but that discretion in its use is called for on two grounds: allergic or anaphylactic reactions may occur in previously sensitized persons, and there is a risk of superinfection or cross-infection with penicillin-resistant organisms, especially staphylococci. The increasing frequency of untoward reactions to penicillin is attributable to the increasing use of the drug, and especially to its uncontrolled, indiscriminate use. Since sensitivity reactions almost always occur in patients previously exposed to the drug, it should not be given for minor ailments or for diseases in which its efficacy is doubtful or not superior to that of other drugs. If it is reserved for cases in which its use is fully justified, the chances of repeated exposures will be reduced to a minimum. Courses should be kept as short as possible by giving high doses. This will also help to diminish the likelihood of creating resistant strains. The risks of cross-infection in hospital can be minimized by suitable hygienic measures.

Another fact that emerges clearly from this survey is that, although minor allergic reactions may occur in up to 1-2% of patients receiving penicillin, severe, anaphylactic reactions are exceedingly rare in comparison with the enormous quantities of penicillin used. It has been estimated that there are probably not more than 25 such reactions for every 10 million injections given and that only about three of these prove fatal. Moreover, it is interesting to note that, of the 12 fatalities reported from Taiwan, 10 were in patients treated by private practitioners and the other two deaths occurred after penicillin injections given in a drug store and by a herb doctor. Only one reaction was reported from a hospital. There is reason to believe, therefore, that severe reactions are much less likely to occur if proper precautions are observed.

Finally, the reactions that penicillin may cause must be set against the great powers which it possesses for the control of communicable diseases. When the entire picture is viewed in perspective, it is seen that penicillin does indeed do its task " with the utmost efficiency and negligible harm ", and that there is ample justification for continuing to regard penicillin as " the queen of drugs ". But, not unlike many queens of the past, she may retaliate on those who do not respect her powers. There is need for education of doctors, nurses and the general public concerning the proper use of penicillin and the risk of sensitization; and the sale of penicillin should be restricted by the introduction of regulations regarding prescription. In mass campaigns, similar tactics should be adopted to those employed to overcome the problem of insecticide-resistance in the control of insect-borne diseases: the work should be intensified so that the value of penicillin can be exploited to the full before, or in case, sensitivity or microbial resistance makes its appearance.

THE FIRST PHYSIOTHERAPY SCHOOL IN SOUTH-EAST ASIA

One of the ways in which WHO assists governments in strengthening health services is by the provision of specialists to organize the setting up of new teaching centres and to train the first students. With the increasing emphasis that is being placed on the rehabilitation of the patient, many governmental health administrations are anxious to add physiotherapy departments to their hospitals and to make provision for the training of sufficient numbers of physiotherapists. Following the severe epidemic of poliomyelitis in India in 1948, the Indian Government requested WHO to send a team to Bombay to investigate the situation and to make recommendations for founding an All-India School of Physiotherapy.

It was decided that the school should be attached to the municipal King Edward VII Memorial Hospital at Parel, a suburb of Bombay, and should include a treatment centre. The Government of India, the Government of Bombay, and the municipality of Bombay undertook joint responsibility for the school—the first of its kind in South-East Asia—and WHO agreed to send two experienced physiotherapists, Mr R. Jacques and Mrs Page Coleman Mehta, to do the initial spade-work. The following account of the first years of the school and treatment centre is based on an article by Mr Jacques published in the April number of *Physiotherapy*.[1]

Space and equipment

One of the main problems that had to be solved when the project was started in October 1952 was to find accommodation for the school and treatment centre, and a minimum of equipment. Some physical therapy was already being given at the hospital, but the "department" consisted of one small room equipped only with two heat lamps and a primitive paraffin wax bath. In three years, a greatly enlarged and well-equipped department was built up, including a treatment room, a small school-room, a wax room, and a store room. To make this expansion possible a gynaecology ward was evacuated and handed over, and later, when the number of patients increased to 100 a day, an adjacent store-room was converted into a gymnasium, where up to 50 patients could exercise at a time. The X-ray department handed over two short-wave diathermy machines, a combined table, and two ultra-violet standard lamps. Couches, gravity tables and many other pieces of equipment were made to specification. Although treatment was free, the donation boxes were well patronized and the contributions helped to pay for additional equipment, including calipers, crutches and urinals for paraplegic patients. Equipment to the value of £3500 was made available by WHO.

The school

In June 1953, the first eleven students began a two years' course of study and practice. The professorial staff of the Seth G.S. Medical College, associated with the hospital, undertook to teach anatomy, physiology and dissection, while training in neurology and psychology, orthopaedics, reading of X-rays, and gynaecology was given in the second year by honorary lecturers. The WHO specialists taught massage, graduated exercises, manual and electrical muscle-testing, electrotherapy of specific conditions, and other techniques of physiotherapy. Examinations were held monthly, at the end of term, and at the end of each year. Diplomas were granted to successful students. At the end of the first course, the two best students were sent to England for a six-months' finishing course, and the

[1] The official journal of the Chartered Society of Physiotherapy of Great Britain

Chartered Society of Physiotherapy arranged an itinerary. These two former trainees are now serving as Superintendent and Assistant Superintendent of the combined school and treatment centre.

The students, of both sexes, were nearly all university graduates (inter-science). They proved to be quick to assimilate the new knowledge and able to use their initiative, an important consideration in a country where ready-made equipment is not always available. The Indian Government was anxious that the school should take students from all parts of India, and the first groups included Mahratti, Gujerati, Sindhi, Goan, Parsee, Malayalee, Punjabi, Moslem and Thai. Owing to economic and other difficulties, however, later groups included a disproportionate number of students from Bombay City, and there is a risk that this area will become overloaded with physiotherapists. Hospital employment was found for most of the students, while others worked for doctors or went into private practice.

The clinic

From 30 patients a day, the "patient load" at the clinic steadily increased, until at times it reached 300 a day. A wide variety of conditions were seen, from leucoderma to leprosy, and from spinal caries to venereal disease. Many patients with fractured femurs came with badly everted limbs and drop-foot with pes cavus. A large supply of sandbags was ordered and splints made for use in the wards. As a result of these measures and the co-operation of the students and nurses, these contractures and deformities had practically disappeared after three years.

The wards also contained many paraplegics, slowly dying of massive bedsores and bladder infections. Most of these patients adopted a fatalistic attitude to their disease, believing that it was their Karma, a punishment for misdeeds in former lives. But once they saw that an interest was being taken in their condition and experienced some of the benefits of modern treatment, they regained hope and became co-operative. With perseverance it was eventually possible to get most of them upright between bars.

The circumstances often called for the use of unorthodox methods, sometimes with surprisingly good results. The most striking were perhaps in long-standing paralysis following poliomyelitis. The methods used included heat treatment, massage, interrupted galvanism, exercises, and short courses of massive faradic stimulation. Treatment often had to be continued for several months before any improvement was seen, but good results were ultimately obtained in patients who could be persuaded to persist long enough. Sudeck's atrophy was successfully treated with paraffin wax and exposure to a heat lamp, with constant movement of the phalanges, for 30-40 minutes three times weekly. Crushed hands responded well to the use of paraffin wax, modelling clay, marbles, and sponge rubber.

Once the department was running smoothly along these lines, the question of extending facilities for rehabilitation arose. In response to a request from the Indian Government, an international rehabilitation team, sponsored by the UN Technical Assistance Administration in New York and the World Veterans Federation, was despatched to India. Based on the King Edward VII Memorial Hospital, the team serves all State and municipal hospitals in Bombay City. By the time the team arrived, some three years after the start of the project, the physiotherapy school was operating independently and was no longer in need of the direct help of the WHO experts, but the work they started continues to bear fruit.

DECENTRALIZATION OF INTERNATIONAL HEALTH WORK IN THE AMERICAS

Zone II : Cuba, the Dominican Republic, Haiti and Mexico

The Pan American Sanitary Bureau (PASB), which serves as the WHO Regional Office for the Americas, started to decentralize its activities over seven years ago, and by 1952 it had six Zone Offices in various parts of the Americas.[1] *This system has been found particularly useful for maintaining with national health authorities the close relationship required for the successful planning and implementation of well-balanced programmes. The article below*[2] *outlines the progress achieved in Zone II—which comprises Cuba, the Dominican Republic, Haiti and Mexico—during the past few years. It will be followed, in future numbers of the Chronicle, by articles on the work of the other Zone Offices.*

In 1952, the Pan American Sanitary Bureau decided to establish a Zone Office in Mexico City to serve Cuba, the Dominican Republic, Haiti and Mexico. The number of PASB/WHO-assisted health projects in the four countries was then relatively small; today it has risen to 55. Zone II office and project staff numbered 86 at the end of 1957, as compared with 15 in 1953.

Mexico

The malaria eradication programme in Mexico is the most important PASB/WHO-assisted project not only in Zone II, but in the whole Region of the Americas.[3] Full-scale spraying operations—planned to continue for four years—started in January 1957 and are proceeding satisfactorily. An international training centre has been set up in Mexico to give antimalaria workers from other countries the benefit of the principles and methods evolved in the course of the eradication programme. PASB/WHO is assisting this centre by providing a training consultant, supplies and equipment, by granting fellowships to trainees from other countries, and by co-operating with the Mexican health authorities in the planning of curricula and the supervision of field training.

With regard to yellow fever, there is reason to believe that the *Aëdes aegypti* population in Mexico is decreasing as a result of the antimalaria operations. More and more persons travelling to jungle areas are being vaccinated against yellow fever, and the Zone Office has facilitated the delivery of increasingly large supplies of vaccine from the Instituto Carlos Finlay in Bogotá, Colombia.

With the co-operation of UNICEF, PASB/WHO has helped to establish comprehensive local health services in one large district of the State of Guanajuato. These services are gradually being extended to cover the whole State and are intended to

[1] Zone I was originally administered from PASB Headquarters in Washington, D.C., and covered Canada, the United States, Alaska, the Falkland Islands, the Hawaiian Islands, and lands in the Caribbean area not responsible for the conduct of their foreign affairs. The only exception was British Honduras, which fitted more conveniently into Zone III. On 1 May 1958, Venezuela was transferred from Zone IV to Zone I; two months later, the Zone I Office was moved to Caracas, Venezuela. As a result of these developments, PASB Headquarters is no longer considered as the Zone I Office, although it continues to have jurisdiction over Canada, Hawaii and the United States.

Zone II includes Cuba, the Dominican Republic, Haiti and Mexico, and the Zone Office is in Mexico City. Zone III, which has its Office in Guatemala City, serves Central America and Panama. PASB/WHO activities in Bolivia, Colombia, Ecuador and Peru come under the jurisdiction of the Zone IV Office in Lima, while the Zone V Office in Rio de Janeiro covers Brazil alone. Zone VI comprises Argentina, Chile, Paraguay and Uruguay, and its Office is in Buenos Aires.

[2] Adapted from an article in *PASO quarterly*, 1958, 2, No. 2, p. 28

[3] See *Chron. Wld Hlth Org.*, 1958, 12, 140.

serve as a model and nucleus for health services throughout the country.

PASB/WHO is also assisting the Mexican health authorities in: rabies control; tuberculosis studies; the production of smallpox vaccine; the improvement of laboratory services; the establishment of rural social welfare units; environmental sanitation; the development of nursing services; health education; and the training of public health workers.

Two seminars recently held in Mexico by PASB/WHO have led to important developments in national health planning. The first was a seminar on the teaching of preventive medicine, held in Tehuacán in 1956, following which 13 schools of medicine in Mexico have established chairs in this subject. The other was the seminar on diarrhoeal disease in childhood held, also in Tehuacán, in 1957;[4] the Mexican participants in this seminar have already undertaken to apply its conclusions and recommendations in the country's public health services.

Haiti

An example of effective co-operation between PASB/WHO and the Haitian health authorities is the yaws eradication campaign now in its final stages. There are no cases of yaws in the north of Haiti, and eradication is almost completed in the south.

In the antimalaria programme, PASB/WHO is responsible for over-all administration and for the conduct of field activities. The programme is about to switch over from control to eradication. Progress has been made in the retraining of control workers and in the selection and training of new personnel, while the delimitation of malarious areas is almost complete.

Other aspects of the Haitian public health programme receiving PASB/WHO assistance include *Aëdes aegypti* eradication, smallpox vaccination, and the reorganization of the public health laboratory. A planning board for public health services has been set up with the participation of PASB/WHO and the US International Co-operation Administration. Following a survey of the medical school in Haiti, the Zone II Office has made proposals for the reorganization of the teaching programme and the improvement of teaching methods.

The Dominican Republic

The success of the model health centre at San Cristóbal—which was started with the co-operation of a PASB/WHO team—has led to the creation of a similar centre in Ciudad Trujillo and a sub-centre in Haina. The training courses for staff for these centres are under the guidance of PASB consultants.

A sanitary code, prepared with PASB/WHO assistance, was recently approved, while all public health forms have been revised in order to establish a uniform system of health records throughout the Republic. The statistical consultant for Zone II helped in the reorganization of the national Department of Statistics, and the death certificate form approved by WHO has been introduced.

The extensive environmental sanitation programme covers drinking-water control, food handling, supervision of waste disposal facilities, construction of latrines in communities and schools, and sanitary landfilling. PASB/WHO is co-operating in malaria and *Aëdes aegypti* eradication, and in other programmes for the control of communicable diseases.

A national nursing school has been established with PASB/WHO assistance, and plans are under way for a survey of the medical school similar to that carried out in Haiti. Special training courses on venereal-disease control, midwifery and sanitation have been organized for professional and auxiliary staff.

A " round table " on public health problems in the Dominican Republic is to be held this year with the participation of PASB/WHO staff from the Zone II Office and the Regional Headquarters in Washington, D.C.

[4] See *Chron. Wld Hlth Org.*, 1958, **12**, 193.

Cuba

In Cuba, special attention is being paid to malaria and *Aëdes aegypti* eradication, the production of smallpox vaccine, and training in sanitary engineering and veterinary medicine. Modern health centres with full-time staff are planned for the near future. As in the Dominican Republic, the PASB/WHO statistics consultant has helped with the reorganization of the country's health statistics system. A number of Cuban professional health workers attended PASB/WHO-sponsored seminars in 1957.

The Zone II nursing adviser has encouraged a study of nursing problems and resources in the country, and PASB/WHO is planning a national seminar on nursing.

* * *

As well as assisting in specific health programmes, PASB/WHO continues to grant fellowships for studies abroad to professional health workers in all countries of the Zone. There is no doubt that the health standards of these countries—which have a combined population of 42 000 000—have greatly improved during the past few years, and that the technical and advisory services provided by PASB/WHO through its Zone Office in Mexico City have contributed to this improvement.

POLIOMYELITIS SURVEY IN GUATEMALA *

From 1943 to 1948, only 42 cases of paralytic poliomyelitis were reported in Guatemala. In 1949, however, 62 cases were reported, and since 1952 there has been an average of over 100 reported cases a year in a population of some 3 million. When it became clear that the disease was endemic in the country, a Poliomyelitis Rehabilitation Centre was opened on the outskirts of Guatemala City, This Centre gradually assumed responsibility for all poliomyelitis work in the country, and its record—particularly in the treatment of acute cases—has been excellent.

Nevertheless, the incidence of the disease has remained high. Although a vaccine is now available, the indiscriminate vaccination of the population would be costly. In the autumn of 1957, the Guatemalan health authorities therefore invited the Pan American Sanitary Bureau (PASB), which acts as WHO Regional Office for the Americas, to study the situation and offer recommendations.

The PASB/WHO team sent to Guatemala for this purpose consisted of a member of the Yale Poliomyelitis Study Unit (which serves as the WHO Regional Poliomyelitis Centre) and a member of the staff at PASB Headquarters in Washington, D. C.

Aims of the survey

The PASB/WHO team carried out a serological survey of the population for the general purpose of determining, by age-group, the occurrence of antibodies against the three types of poliovirus, so that the immunization programme could concentrate on the groups at greatest risk. The specific aims of the survey were:

(*a*) to determine the degree of " natural " immunity to poliomyelitis in normal Guatemalan children and adults, as reflected by the antibody patterns in different age-groups, in both urban and rural areas;

(*b*) to screen children between 6 months and 3 years of age for poliovirus and other enteric viruses by collecting and testing rectal swabs;

(*c*) to see if Guatemala would be a suitable " open community " for future trials with attenuated live poliovirus vaccine.

* Abridged from an article in *PASO quarterly*, 1958, 2, No. 2, p. 42

After the team arrived in Guatemala, it was decided also to compare antibody titres in blood samples collected from vaccinated and unvaccinated children in the same age-groups.

Working methods

The groundwork for the survey was laid by consultations with health officials and by a review of available statistical data on the poliomyelitis situation in Guatemala, and on the limited vaccination programme then being carried out by the Government. These data suggest that in Guatemala poliomyelitis is largely a disease affecting young children, over 80% of the cases reported being children under 5 years of age. Cases occur throughout the year without the marked seasonal incidence experienced in countries where the seasons are more clearly differentiated. Almost half the reported cases occurred in Guatemala City.

In Guatemala City, 201 blood samples were taken from normal or non-febrile individuals in health centres, hospitals and schools, including 32 from children who had been vaccinated against poliomyelitis. In addition, 35 samples were taken from children up to 5 years of age in a semi-rural area.

Rectal swabs were collected from 117 children under 3 years of age, and from a group of 45 adults including a number of the children's mothers. The team hoped to find out whether the taking of rectal swabs could help to determine the percentage of the infant or adult population carrying poliovirus or other faecal viruses at a given time of the year, since this information would be very useful in planning a vaccination programme with attenuated live poliovirus vaccine.

Results

The blood and stool samples were sent under refrigeration to the WHO Regional Poliomyelitis Centre at Yale University for analysis. The preliminary results of virus isolations from rectal swabs are as follows:

— Of 7 patients with paralytic poliomyelitis whose stools or rectal swabs were tested, 3 were positive: one for type 1 poliovirus, and two for type 2.

— Of 16 swabs from normal children from Guatemala City, 5 were positive: one for type 2 poliovirus, and four for agents not yet identified. No virus was isolated from rectal swab specimens from 10 of the children's mothers.

— Of 27 normal children from the semi-rural area surveyed, 7 were found to be excreting viruses: type 1 poliovirus in two cases and, in the remainder, other enteric agents not yet identified.

When the antibody levels of the sera have been determined, and the prevalence of poliovirus and other enteric viruses has been established by testing all the rectal swabs, it should be possible to offer the Guatemalan authorities guidance on the policy to follow in their vaccination programme. The findings of the survey should be helpful also to other Central American countries faced with the same problem.

Tariffs of sanitary charges

Under the International Sanitary Regulations, health administrations are requested to notify WHO of the tariffs of charges in force in their territories for the application of sanitary measures provided for in the Regulations (e.g., vaccination of departing travellers, disinfection, deratting and disinsecting, quarantine isolation and observation). A supplement to a recent number of the WHO *Weekly Epidemiological Record* (No. 20, 1958, Supp. 2) lists the tariffs in force on 16 May 1958 for such measures in more than 100 countries and territories.

COLOMBIA : A COMPREHENSIVE INTERNATIONAL HEALTH PROGRAMME *

The health authorities of Colombia are at present carrying out a comprehensive health programme with international assistance from the Pan American Sanitary Bureau (PASB), which acts as the WHO Regional Office for the Americas. The PASB/WHO team consists of a Country Co-ordinator, stationed in Bogotá, and 14 consultants. Other agencies, including the US International Co-operation Administration (ICA) and UNICEF, co-operate in certain projects.

● Malaria eradication

The plan for malaria eradication provides for complete coverage of all houses in the country's malarious areas, where the population is over 9 million. Spraying started in July 1958, and will continue for four years. The PASB/WHO staff for this project will be increased from 2 to 6 persons in the course of this year, and the Bureau will supply vehicles, drugs, equipment, fellowship grants and training facilities. UNICEF is also contributing substantially to the eradication campaign.

● Smallpox eradication

PASB/WHO provides the services of a medical consultant and a vaccination inspector to advise the Colombian health authorities on the planning and implementation of the country's smallpox eradication campaign, which is one of the principal items on a regional programme to eradicate the disease from the Americas. A training fellowship in connexion with the campaign has been awarded by PASB/WHO, which has also supplied a certain amount of dried smallpox vaccine. UNICEF has provided the equipment for a dried-vaccine production unit.

● *Aëdes aegypti* eradication

A campaign to eradicate the vector of urban yellow fever started in the Caribbean coastal area in May 1952, and is proceeding satisfactorily. Two experts—a medical officer and a sanitarian—have been assigned by PASB/WHO to assist in this work.

● Collaboration with the Instituto Carlos Finlay

The Instituto Carlos Finlay, in Bogotá, is one o two laboratories in the Americas which provide yellow fever vaccine and diagnostic services free of charge to other countries in the Region. During 1957, it supplied some one million doses of vaccine to other countries, and several thousand doses for use in Colombia. PASB/WHO makes an annual grant to the institute, and the Director of PASB serves on its Advisory Committee.

● Leprosy control

The true extent of leprosy in Colombia is as yet unknown. A PASB/WHO consultant is co-operating with the Government in making a complete study of the problem and establishing a control programme based on modern techniques.

● Public health services

A team of 6 PASB/WHO consultants assists in the general public health programme which developed from a maternal and child health project two years ago. The three principal features of the programme are:

(*a*) Reorganization of the central public health services, with the assistance of the first full-time health officers to be trained under the programme (see (*b*) below), and of a Planning Commission which includes the PASB/WHO Country Co-ordinator.

(*b*) Training of personnel. Special training has already been given to 14 doctors, 14 public health nurses, 20 sanitary inspectors, and 14 auxiliary nurses.

(*c*) Establishment of local health services with full-time personnel in the area where trainees are completing their field practice. These will form the nucleus of a system of local health services which will eventually cover the whole country.

In view of the dispersal of health activities in Colombia and the number of consultants engaged in the internationally assisted health programme, the work of the PASB/WHO Country Co-ordinator is of particular importance, since he acts as liaison officer with senior officials, helping to resolve any difficulties that may arise. This method of co-ordination has proved extremely successful in helping the national health authorities to benefit fully from the international aid provided.

* Adapted from an article in *PASO quarterly*, 1958, **2**, No. 2, p. 11

THE PRICE OF MALARIA ERADICATION IN THE AMERICAS

By the beginning of 1958, the Special Malaria Fund of the Pan American Sanitary Organization (PASO), which acts as the WHO Regional Committee for the Americas, amounted to some $4 300 000, including pledged contributions. Though relatively modest, this sum is already sufficient to finance a considerable amount of technical assistance in the form of expert advisers, consultants and training facilities. The programme for the eradication of malaria from the Americas and the PASO contribution to this programme are discussed in the article below.[1]

Experience in many countries has shown that individual lives and national potentialities can be radically changed as a result of malaria eradication, and a number of governments are already basing their long-range economic plans on the estimated post-eradication resources and needs of their countries. Nevertheless, the extent of the problem is such that in some countries malaria eradication programmes tend to fall behind.

With regard to malaria, the countries and territories of the Americas may be divided into three categories:

(i) *With no history of malaria in recent years.* Only Canada, Uruguay, and a few small Caribbean islands come within this category.

(ii) *Where malaria eradication has been achieved.* Barbados, Chile, Martinique and the United States are in this position. The area of eradication covers almost 900 000 square miles with a population of some 45 million.

(iii) *Where malaria has not yet been eradicated.* In this group of 18 countries and 11 territories, malaria was originally reported to affect 4.7 million square miles containing over 85 million people.[2] The disease has still to be eradicated from about 95% of this area, although campaigns are at an advanced stage in some countries (see map on page 310).

In other words the area from which malaria must still be eradicated is approximately five times that of the countries and territories where eradication programmes have been completed, and contains almost twice their population.

Estimated costs

Although the cost of eradicating a disease as firmly entrenched as malaria is high, it more than offsets the economic losses caused by the disease itself. In Peru, for example, recent estimates put the annual economic damage caused by malaria at some $26 000 000; yet a total expenditure of about $8 000 000 would probably finance the eradication of the disease from the country within four years. However, it is not always possible to raise so large a sum for an eradication programme, especially in those countries where the need is greatest.

In March 1957, the Pan American Sanitary Bureau calculated that the total cost of malaria eradication in the Americas would be about $157 000 000. This calculation assumed a concentrated campaign of five years' duration in each country or territory involved. From recent estimates, it appears that all countries in the Americas will have completed their eradication campaigns by 1965 or 1966.

The international contribution

The international contribution to the malaria eradication programme for the Region is estimated at $40 039 997, or slightly over one quarter of the total required.

[1] Adapted from an article in *PASO quarterly*, 1958, 2, No. 2, p. 4

[2] PASB working document CD10/21

MALARIA CONTROL AND ERADICATION IN THE AMERICAS, DECEMBER 1957

FINANCIAL PLAN FOR PARTICIPATION OF PASO IN THE MALARIA ERADICATION PROGRAMME IN THE AMERICAS, 1957-1965

	Total	1957	1958	1959	1960	1961	1962	1963	1964	1965
	$	$	$	$	$	$	$	$	$	$
International technical personnel assigned to country projects (including allowance and travel)	2 550 016	123 663	467 633	478 720	500 000	500 000	375 000	55 000	25 000	25 000
Vehicles for international staff assigned to country projects	120 920	59 050	48 930	7 770	5 170	—	—	—	—	—
Supplies and equipment for country projects	8 779 499	67 000	948 633	1 421 103	1 454 726	1 786 517	1 599 720	1 219 650	188 100	94 050
Technical direction and co-ordination	1 179 497	144 849	145 566	154 082	163 000	172 000	180 000	80 000	80 000	60 000
Inter-country projects and Zone Office supporting services	946 139	75 034	153 108	171 497	200 000	200 000	68 750	62 750	15 000	—
Training schools	525 549	154 843	180 644	110 062	80 000	—	—	—	—	—
Fellowships and national trainees for country projects	311 535	96 275	110 370	74 890	30 000	—	—	—	—	—
Technical conferences for national and international personnel	274 490	49 440	78 350	58 900	48 900	38 900	—	—	—	—
Technical bulletins and manuals	100 000	15 000	30 000	25 000	10 000	10 000	10 000	—	—	—
Evaluation surveys	1 854 794	42 364	126 138	136 292	260 000	270 000	280 000	290 000	300 000	150 000
Operational assistance—certain country projects	2 828 658	103 920	485 334	583 026	583 026	490 326	—	—	—	—
Investigations and special applied research	250 000	32 500	125 000	92 500	—	—	—	—	—	—
Contingency reserve fund	550 000	50 000	100 000	100 000	100 000	100 000	100 000	—	—	—
TOTAL	20 271 097	1 013 938	2 999 706	3 413 842	3 434 822	3 660 443	3 103 796	1 707 400	608 100	329 050

The Executive Board of UNICEF has already approved in principle a contribution of $14 234 047, which will cover a substantial part of the cost of insecticides, spraying equipment and transport. UNICEF is also planning to furnish supplies and equipment to a value of $5 534 853.

This leaves a balance of $20 271 097 to be covered by international contributions, of which some $4 000 000 is already credited to the PASO Special Malaria Fund. The financial plan for the Organization's participation in the programme is outlined in the table on page 311; it is of course contingent on the availability of the full amount. The estimates fall off sharply after 1962 as by then the campaigns will be drawing to an end.

Outside the framework of the general programme, the US International Co-operation Administration contributed $2 000 000 to selected antimalaria campaigns in the Americas during the US fiscal year ending 30 June 1958.

Growth of the PASO Special Malaria Fund

The Special Malaria Fund was established in January 1955 with an allocation of $100 000 from 1954 surplus PASO funds, as authorized by the XIVth Pan American Sanitary Conference.[3] An increase in the Fund from available surpluses was authorized later in the same year by the PASO Directing Council. At the beginning of 1957, the Fund stood at $154 593, and provision was therefore made in that amount for technical assistance, supplies, fellowships and conferences. Then, in March 1957, the United States Government made a special contribution of $1 500 000 to PASO for malaria eradication. This was followed, a month later, by the announcement of a donation of $500 000 (to be paid in five annual instalments of $100 000) from the Government of the Dominican Republic. Shortly afterwards, the Government of Venezuela made a contribution of $299 600 (1 000 000 bolivars), and in December 1957 the US Government made a further grant of $2 000 000. Thus, by the beginning of this year, voluntary contributions to the Fund amounted to $3 899 600 with a further $400 000 pledged.[4]

The fact that so many generous donations to the Fund have been received in the space of one year reflects a growing awareness of the malaria problem on the part of the American governments. There is therefore every reason to suppose that the necessary sums will be forthcoming to enable PASO to meet its future commitments in the general malaria eradication programme of the Region.

[3] In recent years, the annual PASO budget has included an item of $100 000 for antimalaria activities; this is not considered as part of the Special Malaria Fund.

[4] A contribution of $5000 has since been received from Haiti.

PLAN FOR LEPROSY CONTROL IN PARAGUAY *

The health authorities in Paraguay are paying special attention to leprosy, which is one of the country's most important endemic diseases. In 1953, the Paraguayan Leprosy Department—assisted by a WHO consultant, Dr Lauro de Souza Lima—prepared a leprosy control plan with the following features : (*a*) detection of cases of indeterminate type (which constitute latent foci of contagion), followed by sulfone treatment to render them non-contagious ; (*b*) control of family and other contacts (among whom the majority of cases of indeterminate type are found); (*c*) abolition of coercive measures such as compulsory isolation, in accordance with the modern concepts of leprosy control advocated by the Third Pan American Conference on Leprosy (Buenos Aires, 1951).

In 1955, a preliminary survey of schoolchildren between the ages of 6 and 15 was

*Summary of an article by Dr Amelia Aguirre de González, published in *Bol. Ofic. sanit. panamer.*, 1958, **44**, 411

carried out in the towns of Asunción and Luque. The aim was to detect leprosy cases, to start treating them, and to carry out dermatological examination and lepromin-testing of contacts. Among 7390 children examined in Asunción, 16 cases were detected, while 4 cases were found among the 1589 children examined in Luque, the prevalence rates being 2.16 and 2.50 per 1000, respectively.

General plan of operations

The general plan for leprosy control in Paraguay was prepared with technical assistance from WHO and material aid from UNICEF. It includes: detection of cases and foci of infection; control of contacts; preventive measures ; health education and specialized training in leprology.

Detection of cases and foci of infection

Cases are detected by large-scale dermatological examination of persons belonging to certain social groups, such as students, recruits, civil servants and manual workers. For the rest of the population it is necessary to rely on compulsory examinations for health certificates, case-finding at official health centres, and examinations to confirm notified cases. The Leprosy Department will continue to employ these methods until people can be encouraged, through health education, to come for examination voluntarily and the endemic finally dies out.

Case-finding also helps to establish the foci of infection, each of which has three elements: the individual source of contagion, the detected case, and family and other contacts.

Treatment

Once cases and foci have been detected, patients are registered and classified, and out-patient treatment begins. The drug usually employed is 4-4′ diaminophenylsulfone, with iron salts and vitamin B_1 as adjuvants in most cases. If the drug is not tolerated or if resistance or habituation threaten to develop, other derivatives of this sulfone have to be employed ; administered by the endovenous route, these can be very useful in the acute phases of the disease. For the treatment of complications of the lepromatous-reaction type, the following drugs are recommended: calcium gluconate, sodium hyposulfite, antimony salts and, in the case of certain ocular complications, antibiotics and cortisone. The Leprosy Department is going to try out a system of treatment with the parent sulfone in hydrogel suspension —administered monthly or every three weeks —and the isopropylate or monopropylate sulfones administered orally once a week.

Control of contacts

This is one of the most important features of the campaign, and begins as soon as a focus has been located. Control is exercised by means of dermatological and neurological examinations.

Since the number of foci increases as case-finding progresses, this task will require the services of an increasingly large staff, and will have to be carried out systematically on the basis of the following criteria: (*a*) *lepromin rate in the focus* (obtained by applying the lepromin test to all contacts and classifying them into Mitsuda-positive and Mitsuda-negative); (*b*) *clinical form of the disease* (lepromatous, tubercular, or indeterminate types, the patients in the indeterminate group being considered as lepromatous for control purposes); (*c*) *age of contacts* (an important factor in susceptibility to infection).

The Leprosy Department is concentrating on three types of contacts: without resistance (Mitsuda-negative); particularly exposed to infection (contacts of lepromatous cases); and particularly susceptible (younger age-groups). Dermatoneurological examinations of all cases will be carried out over a minimum period of five years, and every effort will be made to persuade patients to bring their contacts to the clinic for examination.

Preventive measures

Compulsory segregation in leprosaria has been abolished, but the Leprosy Department is authorized to enforce more or less temporary hospitalization in certain cases, e.g.,

when home conditions are bad, when specialized treatment is needed, or when newborn babies have to be protected from the disease.

In the absence of any means of immunization against leprosy, BCG-vaccination is used for all Mitsuda-negative contacts; this makes them Mitsuda-positive and thus more resistant to infection.

Health education and specialized training in leprology

The above-mentioned activities will be supplemented by a health education programme and facilities for the specialized training of medical personnel in leprology. The health education programme will be aimed at the general public, the medical profession, and patients undergoing treatment in dispensaries and health centres. It will stress the contagious nature of leprosy, its initial symptoms, the possibilities of sulfone therapy and the advantages of early diagnosis. It will also seek to remove the stigma attaching to leprosy, and to make patients understand that, with regular treatment, the disease can be cured.

The specialized training programme will include theoretical and practical courses for new and future members of the Leprosy Department and for medical officers attached to national health services, together with in-service training and fellowships for study abroad.

Notes and News

Public health training for foreign students

In many countries which are building up their health services, there are no facilities for the public health training of the physicians who are to direct and staff these services, while in others the available facilities are insufficient to meet the needs of every candidate. To help solve this problem, WHO awards a number of fellowships for post-graduate studies in public health abroad. Under this scheme, 205 fellows—mostly physicians—from 62 countries and territories were able to take courses for diplomas in public health in the years 1954-57.

It may be asked whether the training given to these students is meeting their needs at home. The answer to this question is to be found in the reports received by WHO both from the students themselves and from professors who have had the opportunity—also through WHO fellowships—to see at first hand the needs of the countries from which their foreign students come. While the courses have on the whole been found satisfactory, both professors and students have suggested certain adjustments.

A group of experts, including deans and professors of schools of public health, was convened by WHO during July to discuss how public health courses might be adjusted to meet the needs of foreign students attending them. The following topics were reviewed, among others: the integration of foreign students into the class; the curricula and organization of courses attended by these students; facilities for field training; and admission requirements in relation to the different backgrounds of foreign students.

Should publication of the report of this group of experts be authorized by the WHO Executive Board at its session in January 1959, it will appear in the WHO Technical Report Series in the spring of that year.

Courses in public health dentistry

A survey completed last year by the Pan American Sanitary Bureau (PASB), WHO Regional Office for the Americas, revealed an acute shortage of public health dentists in the majority of countries in the Region. An agreement was therefore concluded between the University of São Paulo (Brazil), PASB/

WHO and the Kellogg Foundation, for the provision of public health dentistry courses at the University's school of public health.

The courses, which are open to students from other Latin American countries as well as Brazil, were prepared by the teaching staff of the University with the co-operation of the PASB/WHO regional adviser in dental health. The first courses started in February of this year and were attended by 17 students from 8 countries; 8 of the students had been awarded PASB/WHO fellowships.

Other agencies are co-operating by providing guest lecturers to extend the range of the courses. Thus the US International Co-operation Administration adviser to the Brazilian Special Public Health Services is teaching techniques based on time-and-motion studies and designed to eliminate wasteful movements in dental practice.

Histological definitions of cancer types

Formerly, WHO's contribution to the study of cancer was restricted to the statistical analysis of mortality and morbidity data.[1] During the last few years, however, studies on the epidemiology of cancer carried out in various parts of the world have underlined the importance of geographical pathology and the need to attack the problem on an international level. Consequently, WHO has felt obliged to revise its programme of activities in this field. As early as 1955, a group of consultants recommended that laboratories with special experience should be made responsible for maintaining collections of histological material to serve as reference standards for laboratories all over the world.[2] The ultimate aim is to establish histological definitions which would facilitate the adoption of a uniform nomenclature. The confusion which at present exists with regard to the meaning of terms applied to various types of cancer has, in fact, already retarded the progress of a number of studies.

In accordance with a resolution adopted by the WHO Executive Board in 1956, a Study Group was convened to examine what action might be taken. The Group recommended that WHO should designate international centres to work in liaison with specialist institutes in various countries. Some countries already have reference centres, as indicated in reports presented to the Study Group. In the United States, for example, there are many large pathology laboratories associated with schools of medicine or with hospitals. The American Registry of Pathology, with the support of the National Research Council and various medical associations, maintains large collections of tumours contributed by pathologists.

In India, the Registry of Hepatic Pathology attached to the Agra Medical College, has a collection of material from different parts of the country which it puts at the disposal of research workers and schools of medicine. The Registry also serves as a centre for the exchange of material with other countries. It is proposed, in the near future, to establish similar registries of oropharyngeal and ovarian tumours.

In Norway, five laboratories provide diagnostic services. Follow-up and control of diagnoses are greatly facilitated by the Norwegian Cancer Registry which is an independent institution.

In the United Kingdom, the Cancer Registry, maintained by the General Register Office, receives reports on cancer cases from many hospitals.

In Africa and South America, the immense distances, transport difficulties and the wide areas served by some of the medical centres are serious obstacles to the implementation of the project under discussion. Nevertheless, the centres in some large cities could provide certain facilities.

The members of the Study Group discussed the criteria to be adopted for selecting the types of cancer for the preliminary studies. It was suggested that the choice should be based on: frequency; variation in geographical distribution; importance to public health (epidemiology and prevention); the value of a standardized nomenclature for diagnosis and treatment; and the degree of confusion in existing nomenclature. Tumours of the liver,

[1] See *Chron. Wld Hlth Org.*, 1955, 9, 234 ; 1956, 10, 248, 406.
[2] See *Chron. Wld Hlth Org.*, 1955, 9, 237.

lungs, salivary glands, breast, oropharynx, skin and soft tissue were then considered by the Group from these various angles. Finally, it was decided that it would be advisable to limit the initial programme to the following sites, in order of priority: oropharynx, lungs, soft tissue, breast.

The centres would be established in several countries (the proposals covered three continents) which already have laboratories specializing in and suitably equipped for this kind of research. Their function would be to establish definitions of cancer types, in collaboration with other specialists. When agreement had been reached, the histological preparations would be placed at the disposal of the various national institutes. These in their turn would be able to obtain advice from the international centre in difficult cases.

In addition to giving financial aid to the international centres, WHO would organize the distribution of information and reports to governments and would seek the collaboration of non-governmental professional organizations. The Study Group expressed the hope that the proposed system of international centres would receive the support of the pathologists themselves and of non-governmental organizations interested in the establishment of histological definitions of cancer types.

Water-supplies in the Eastern Mediterranean Region

Technicians from 12 countries in the Eastern Mediterranean Region took part in a waterworks training course held under WHO auspices in Alexandria, Province of Egypt, United Arab Republic, during May. The course was conducted by water and sanitation specialists from Egypt, the Netherlands, and the WHO Regional Office for the Eastern Mediterranean.

Participants in the course were invited to submit statements—of a personal and unofficial nature—on waterworks facilities in their respective countries. From these statements, it appears that supplies of pure drinking-water are still inadequate in many parts of the Region, and particularly in rural areas. The proportion of the population served by modern water-supply systems is insignificant in certain territories with scattered populations, such as Somalia, and in some places it is relatively high (50% in Jordan, 70% in Iraq, and 80% in Egypt).

The rapid growth of the population in some of the large cities of the Region has added to the problem. In Amman, Jordan, where the population has risen from 30 000 to 200 000 in only ten years, the water resources consist of two springs and two wells, the output of which fluctuates according to the rainfall. During the dry season, the daily consumption of water per head cannot exceed 50 litres and the water-distribution network can function only intermittently. A similar situation has arisen in Karachi, West Pakistan, and in Beirut, Lebanon.

The towns of Egypt are relatively more favoured: they are served by 40 water-supply plants and 6 water-processing installations which permit an average daily consumption of 120 litres per head (250 litres in Cairo and Alexandria). Underground waters are the main sources of supply in Upper Egypt and the southern part of the Nile Delta, and 1400 pumping stations already distribute drinking-water to 8 million of the country's rural inhabitants. In the Fayoum district and the northern part of the Nile Delta, 60 plants, some with a daily output of 3000 m^3, are each supplying purified water to an average of 30 000 inhabitants of rural communities.

Similar rural water-supply networks exist in Jordan and Saudi Arabia (see below), both of which are richly endowed with underground water, but they are far more costly than those in Egypt where the density of the rural population is greater.

Rivers and streams are the main sources of water-supply in Iraq and, to a lesser extent, in Pakistan and Lebanon. Eighteen plants connected with the Tigris and Euphrates rivers supply 5 million of Iraq's 7 million inhabitants with purified drinking-water. Most of the country's rural areas, however, are still unprovided for in this respect.

In Pakistan also, few rural areas are supplied with treated water, although it is available to 50% of the urban inhabitants. Under the 1955-60 five-year plan, water-supplies are being extended to more rural and urban areas, but, as the total population of Pakistan is 80 million, the country's waterworks technicians are faced with a formidable task. A comparable situation exists in Iran where, despite recent improvements, only 2½ million of the country's 20 million inhabitants as yet enjoy a supply of pure water.

In Saudi Arabia, most of the water has to be drawn from underground sources, which are sometimes as much as 1500 metres below the surface. The question of drinking-water supplies is particularly important in Mecca, which is visited by about a million pilgrims each year. There, rainwater flowing from nearby mountains is collected in two large man-made cisterns, known traditionally as the "Zobeida" and "Azizia" springs. It is then fed into small collective tanks, the contents of which are intermittently chlorinated. Doubts have been raised about the effectiveness of this system, and other means of purifying the Holy City's water are being considered.

Smallpox epidemic in Pakistan

During June, WHO shipped two million doses of smallpox vaccine to Pakistan in response to a request from the Government for help in dealing with the worst smallpox epidemic the country has experienced since its creation in 1947. This emergency shipment was authorized following consultation with members of the WHO Executive Board.

Preliminary estimates indicate that, during the first five months of 1958, there were more than 35 500 smallpox cases and more than 15 800 deaths from the disease in Pakistan, nearly all of them in the eastern part of the country. The corresponding figures for the same period last year were 13 400 and 5900. The incidence of the disease in Pakistan, which usually reaches a peak every six or seven years, has been increasing steadily since 1954, amounting to almost 25 000 cases in 1957. Mass vaccination of the population is expected to prevent a repetition of the situation in 1944, when there were 140 000 deaths from smallpox in Bengal (now divided into East Pakistan and the Indian State of West Bengal).

Malaria conference in Bucharest

Malaria has been eradicated from Italy and Corsica and is on the decline in other parts of Europe, which may thus become the first continent to wipe out the disease. To achieve this aim, however, firm and energetic action is still required.

Under the auspices of the WHO Regional Office for Europe, representatives of ten countries of South-East Europe and the Eastern Mediterranean Region met in Bucharest, in June, to discuss their common malaria problems and the co-ordination of their campaigns against the disease. This conference continued the work of two earlier conferences held in Belgrade in 1955 and 1957. The following countries were represented: Afghanistan, Albania, Bulgaria, Greece, Iran, Romania, Turkey, United Arab Republic (Province of Syria), USSR and Yugoslavia.

Recommended requirements for poliomyelitis vaccine

Manufacturing and control requirements that can be internationally recommended in order to ensure safe, potent and reliable preparations of poliomyelitis vaccine have been formulated by the WHO Study Group on Recommended Requirements for Poliomyelitis Vaccine, which met recently in Geneva. When issued, these requirements are expected to facilitate the international exchange of poliomyelitis vaccines, and to be helpful to countries wishing to start vaccine production and control.

The following experts took part in the meeting of the Study Group: Dr O. Bonin (Germany), Dr D. G. Evans (United Kingdom), Professor S. Gard (Sweden), Dr J. H. S. Gear (Union of South Africa), Dr A. Lafontaine (Belgium), Dr P. Lépine (France), Dr H. von Magnus (Denmark),

Dr R. Murray (United States), Dr G. Penso (Italy), and Dr V. Soloviev (USSR). Dr U. Krech (Switzerland) attended the meeting as a consultant.

Expert Committee on Auxiliary Dental Personnel

The WHO Expert Committee on Auxiliary Dental Personnel met in Geneva at the end of June to discuss the expansion of dental services throughout the world by the use of auxiliary personnel and, with this end in view, to consider a classification of these services which would be applicable to countries in varying stages of cultural and economic development. Such a classification could have a wide range, and training requirements for auxiliary personnel could be adjusted accordingly.

The following experts took part in this meeting: Dr J. Deeny (Ireland), Dr A. I. Doinikov (USSR), Dr A. Maxwell Horsnell (United Kingdom), Dr Olof K. Osvald (Sweden), Dr Shailer Peterson (USA), Dr J. Llewellyn Saunders (New Zealand), and Dr C. J. Sundram (Malaya). Professor F. C. Wilkinson, Dean and Director of Studies, Institute of Dental Surgery, London University, acted as consultant to the Committee.

Post-graduate nursing courses in Indonesia

In 1952, the Government of Indonesia opened a post-graduate school for the training of nursing teachers at Bandung, with assistance from the US Technical Co-operation Administration (now the US International Co-operation Administration). The Government then decided to extend the school's programme to include courses in the teaching of midwifery and in public health nursing; WHO and UNICEF were asked to assist this project by providing staff and equipment, respectively. Between January 1954 and September 1957, two WHO public health nurses (Miss B. Hegarty and Miss G. M. Pringle) and two WHO midwifery tutors (Miss A. Milton and Miss V. Gibbs) were assigned to the school to organize and develop the additional courses.

In planning these courses—which are now being continued by the school's Indonesian staff—an attempt was made to combine classes in both branches where appropriate, and the curricula were revised several times to ensure adequate training. Special attention is paid to field work which is carried out at two centres—municipal and semi-rural—serving between them a total of some 180 000 people. The public health nursing students gain practical experience in maternal and child health centres and in a school health service; they are also allowed to undertake teaching and home visiting. The future midwifery tutors have an opportunity to practice teaching at hospitals, clinics and midwifery training schools. During the period of WHO assistance, 30 public health nurses and 43 midwifery tutors were trained by the school, and all have found suitable employment.

Preparation of a new batch of tuberculin for vaccination campaigns

Batch RT 22 of purified tuberculin (PPD), prepared and held by the Statens Serum-institut, Copenhagen, has been used since 1950 in systematic BCG-vaccination campaigns and is now nearly exhausted. A new batch of 650 g (RT 23) has just been prepared by the same institute at the request of WHO and UNICEF. It is expected to meet the demand for tuberculin for more than ten years.

Tests in humans have shown that RT 23 elicits stronger reactions than RT 22. In other words, a smaller concentration is required to elicit the same reaction.

Another change has been introduced in the preparation of tuberculin for pre- and post-vaccination tests. A stabilizing agent, Tween 80, will in future be added to the fluid used for diluting the tuberculin. This stabilizer will prevent the adsorption of the tuberculin by the glass of the containers and the fairly rapid attenuation of its activity which this produces. The tuberculin dilutions will be more stable and more specific in the reactions they elicit; their activity will be more uniform and the bullous reactions at the injection point will be less numerous.

The tuberculin of the new batch, in the new diluent, will thus be more active than the preparations used hitherto. Technical instructions are being addressed to the laboratories preparing dilutions used for tuberculin tests. No change in the screening criteria for tests is needed.

Malaria control in Africa

Between January and May 1958, Dr M. A. C. Dowling, WHO regional malaria adviser for Africa, visited a number of countries and territories south of the Sahara to study antimalaria programmes and advise on their conduct. New malaria projects have been started or have reached the final planning stage in several of these countries and territories, namely, British Somaliland, French Cameroons, French West Africa (Dahomey, Senegal and Upper Volta), Liberia, Togo and Uganda. In the Federation of Rhodesia and Nyasaland, a plan for intensified research on malaria is in preparation, and training courses for antimalaria workers have been started in Tanganyika. In Ghana, Dr Dowling had discussions with the WHO Advisory Team on *Anopheles gambiae*, whose services have been made available to all African governments by the Organization. The WHO adviser also visited Kenya, Madagascar, Mauritius, Nigeria and Zanzibar to review the progress of malaria projects or discuss future operations with the responsible authorities.

People and Places

Yaws control in the South Pacific

For the past four years, a WHO team has been helping governments of various island territories in the South Pacific to organize yaws control campaigns. The team also trains local personnel in the diagnosis, therapy and epidemiology of yaws.

Dr Ping-Nan Wang has joined this team as serologist for the yaws control campaign in the New Hebrides. A graduate of the Okayama University Medical School, Japan, Dr Wang is on loan from the Serum Vaccine Laboratory in Taiwan (China), where he has been responsible for the training and supervision of serological laboratory staff working in the WHO-assisted venereal-disease control campaign.

Training of occupational health workers

Professor Sven Forssman, of Sweden, has succeeded Professor Leonard J. Goldwater,[1] of the United States, as WHO visiting professor at the Department of Occupational Health attached to the High Institute of Public Health, Alexandria, Province of Egypt, United Arab Republic. This appointment is in accordance with the Institute's policy of having, as visiting professors of occupational health, leading specialists from schools in different parts of the world. In this way, it is hoped to make the Institute's training courses in this branch as comprehensive as possible.

Professor Forssman is Associate Professor of Occupational Health at the Karolinska Institutet, Stockholm, and medical adviser to the Swedish Employers' Confederation. He has been associated with WHO since 1950 and has carried out occupational health surveys in India and Egypt on behalf of the Organization.

Exchange of teachers

In co-operation with Johns Hopkins University, Baltimore, Md., USA, and the Rockefeller Foundation, WHO is helping to strengthen the faculty of the Institute of Hygiene, University of the Philippines, Manila, by organizing a programme of exchange between members of the teaching staffs of the Institute and the Johns Hopkins University School of Hygiene and Public Health.

Dr Paul V. Lemkau, of Johns Hopkins University, is at present in Manila to advise the Institute of Hygiene on exchanges in the field of mental health. Formerly Director of Community Mental Health Services in New York and Chief of the Division of Mental Health, State Health Department, Maryland, Dr Lemkau made surveys of mental health facilities in Yugoslavia and Japan in 1951 and 1953, respectively, under WHO auspices.

Bilharziasis control in the Philippines

Since June 1952, a WHO team has been engaged in a pilot project for the control of bilharziasis in

[1] See *Chron. Wld Hlth Org.*, 1957, 11, 327.

the island of Leyte, Philippines. The aims of the project are: to make an epidemiological study of the disease and determine the most effective and economical means of controlling it; to study the human, domestic-animal and snail hosts of *Schistosoma japonicum* and the parasite itself; to plan a control programme; and to train local professional and auxiliary personnel.

Dr William Alves, who has been Director of the Malaria and Bilharziasis Research Laboratory in Salisbury, Southern Rhodesia, for the past thirteen years, has been appointed senior adviser on the WHO team. Dr Alves has worked for WHO as a bilharziasis consultant on several occasions, and has served on the WHO Expert Advisory Panel on Parasitic Diseases.

Headquarters appointment

Dr Noel Chilton, of the United Kingdom, has been appointed Chief of the Malaria Technical Intelligence Unit in the Programme Section of the Division of Malaria Eradication recently established at WHO headquarters. In this capacity, he will organize the collection and circulation of information on malaria control and eradication, and will prepare monthly bulletins on the progress of eradication programmes throughout the world.

Dr Chilton was educated at Oxford and the Medical College of St Bartholomew's Hospital, London, subsequently specializing in public health and in tropical medicine and hygiene. From 1929 to 1955, he was attached to the Medical Services in Tanganyika, where his final post was that of Acting Deputy Director. For the past two years he has been public health adviser at the WHO Regional Office for Africa.

Classification of psychiatric disorders

As part of a long-term WHO programme for the study of the incidence and prevalence of mental illness, Professor Erwin E. Stengel, Chairman, Department of Psychological Medicine, University of Sheffield, United Kingdom, will shortly start a comparative study of existing classifications of psychiatric disorders. A graduate of the Universities of Vienna and Edinburgh, Professor Stengel is President of the Section of Psychiatry of the Royal Society of Medicine.

Appointment of PASB Assistant Director

Dr Carlos Luis González, of Venezuela, has returned to the staff of the Pan American Sanitary Bureau (WHO Regional Office for the Americas) as Assistant Director. Dr González studied medicine at the Central University of Venezuela, Caracas, and at Johns Hopkins University, Baltimore, Md., where he obtained the degree of Doctor in Public Health. He first joined the staff of the Pan American Sanitary Bureau in 1953, serving as its Assistant Director from 1954 until early this year when he resigned to take up the post of Minister of Health in Venezuela.

Review of WHO Publications

BILHARZIASIS

Bulletin of the World Health Organization, 1958, Volume 18, Number 5-6 (pages 685-1118)

This number of the Bulletin contains some of the epidemiological studies on bilharziasis submitted by WHO consultants to the African Conference on Bilharziasis, held at Brazzaville in 1956, together with a number of papers—also prepared for the African Conference—on other aspects of the disease: ecology of the vector snails, man-snail-parasite relationship, diagnostic methods, snail control, human therapy, and prevention of spread.

The first article, by E. Abdel Malek, discusses the distribution of the intermediate hosts of bilharziasis (*Bulinus* and *Biomphalaria*) in the Nile Basin and the Sudan, with special reference to the influence of hydrographic and hydrogeological factors. This is followed by a paper on the prevalence of bilharziasis in Swaziland by R. J. Pitchford, who also contributes two short notes on the bilharziasis position in Basutoland and Bechuanaland. Yet another gap in the

knowledge of the geographical distribution in Africa is filled by J. Fraga de Azevedo, who gives a brief summary of the prevalence of human bilharziasis in the British Cameroons.

Before effective snail-control measures can be introduced, it is necessary to know something of the conditions under which the snails live and breed in the area to be treated. On this fundamental subject of the ecology of the snail vectors there are a number of papers. J. Gaud studies the seasonal and climatic factors affecting the life-cycle of *Bulinus truncatus* and *Planorbarius metidjensis* in North Africa; B. de Meillon, G. H. Frank & B. R. Allanson discuss some aspects of snail ecology in South Africa; E. Abdel Malek reviews the factors conditioning the habitat of the family Planorbidae, particularly in Egypt and the Sudan; H. W. Harry & D. V. Aldrich deal with the ecology of *Australorbis glabratus* in Puerto Rico; and J. M. Watson gives a comprehensive account of the ecology and distribution of *B. truncatus* in the eastern Mediterranean countries. In addition, notes on snail habitats and their conditioning factors are contributed by F.-G. Marill, W. Alves and B. Hubendick.

In his article on the ecology of *B. truncatus*, Watson also touches upon the question of the effect of certain types of human activity on the prevalence of bilharziasis—a question that introduces the broader subject of the relationship between vertebrate host, intermediate host and parasite. This subject is dealt with in some detail by F. S. Barbosa & L. Olivier, who present the results of studies on the snail vectors of bilharziasis mansoni in north-eastern Brazil; by A. Buttner, who discusses the mollusc-schistosome " complex " in Brazil; and by A. V. Martins, who reviews the results of experimental studies on non-human vertebrate hosts of *Schistosoma*. Shorter contributions include a brief survey of the animal reservoirs of human bilharziasis in the Eastern Transvaal (R. J. Pitchford), a review of the role of population movements and of human activities in the epidemiology of bilharziasis (J. Gaud), a note on the influence of the living conditions of the Africans on the incidence of bilharziasis in the Transvaal (R. J. Pitchford), a study on the distribution of *Schistosoma* eggs in human tissues (W. Alves), a discussion of acquired resistance to *Schistosoma* infection in experimental animals (H. Vogel), and an account of some studies carried out on the relation between parasitism and the nutritional state (A. R. P. Walker).

If epidemiological surveys are to give a true picture of the prevalence of bilharziasis and are to yield comparable data, a simple, accurate and uniform diagnostic method must be used. The presence of schistosome eggs in the urine or faeces has been widely used as a diagnostic criterion, but it is an unreliable one in the later stages of the disease, when elimination of the eggs is rendered increasingly difficult. To solve this problem an immunological test, based on the cutaneous response to an injection of an antigen prepared from the cercariae, adult worms, eggs or miracidia of *Schistosoma*, has been developed. J. Pellegrino gives a detailed description of this test, covering all aspects from the various procedures for obtaining the basic material for antigen preparation to the skin-testing technique and evaluation of the results. Other contributions on the subject of immunology are a short note on the use of the circumoval precipitin reaction as a diagnostic test and as a test for evaluating the results of treatment (R. Rodríguez-Molina, J. Oliver-González & Diana G. Serrano) and a brief review of the results of complement-fixation tests in schoolchildren after successful treatment (B. de Meillon & E. A. Hollingham).

The next two papers are concerned with snail control by means of molluscicides. W. H. Wright, C. G. Dobrovolny & E. G. Berry present the results of field trials of sodium pentachlorophenate, copper sulfate and dinitrocyclohexylphenol, and E. Paulini contributes a general review of the present status of molluscicidal treatment.

Snail control with chemicals, though a valuable temporary measure, is too costly to be practical as a single long-term method of preventing the transmission and spread of bilharziasis, but it will give lasting results

when combined with other preventive measures. One such measure is human chemotherapy—a subject dealt with in an article by D. M. Blair, who reviews the published work on the treatment of bilharziasis with lucanthone hydrochloride, and in notes by W. Alves and R. J. Pitchford, who discuss the results of mass treatment with the same drug in Southern Rhodesia and in the Transvaal, respectively.

Another line of approach is put forward by J. N. Lanoix. In an article on the relation between irrigation systems and the transmission of bilharziasis, he points out that the irrigation engineer can play an important part in checking the spread of the disease, by designing irrigation structures in such a way as to avoid creating favourable habitats for the vector snails. A further possibility —the control of vector snails by competition between resistant and susceptible strains—is suggested in a note by B. Hubendick.

In the final article in this issue of the Bulletin, D. B. McMullen & H. W. Harry outline the basic principles to be considered in bilharziasis control, drawing attention to the desirability of placing in perspective the various aspects of the problem: health education and sanitation, human therapy, and the role of the intermediate and reservoir hosts.

The list of contents will be found in the advertising section at the end of this number of the Chronicle.

COMMUNICABLE DISEASES

Bulletin of the World Health Organization, 1958, Volume 19, Number 1 (pages 1-222)

This number of the Bulletin contains a collection of articles on a small group of communicable diseases: yellow fever, diarrhoeal disease in children, malaria, onchocerciasis, whooping cough, smallpox, trachoma, streptococcal infections, and brucellosis.

The Federation of Ethiopia and Eritrea has common frontiers over a distance of 3000 km with countries where yellow fever is endemic or enzootic. Although no authenticated case of yellow fever has ever been reported in the Federation, serological examinations have from time to time revealed the presence of antibodies in certain members of the population. With the assistance of WHO, a systematic epidemiological survey was carried out by the Government in eight provinces, aimed at finding antibodies in the population and discovering possible insect vectors. The results are reported by M. A. Chabaud & M. Ovazza. Although the majority of sera examined were negative, a certain number of inhabitants in the province of Assab (Eritrea) appear to have been in contact with the virus, the last occasion having been some time between 1951 and 1954. This province contains a zone of yellow fever endemicity, and *Culicidae*, possible vectors of yellow fever, were found in most of the surveyed regions below 2000 metres.

In the countries of the Americas, one of the principal causes of death is the group of diseases responsible for diarrhoea in children. L. J. Verhoestraete & Ruth R. Puffer have studied the distribution of the relevant death rates and find that they are correlated with the standard of living, especially with protein deficiency in the diet.[1]

Chemotherapy has been recommended as an adjunct to residual spraying operations in malaria eradication campaigns. In order to ensure that people have a regular intake of the drug in sufficient quantity, its incorporation in ordinary household salt has been suggested. R. G. Coatney and co-workers report that the administration of chloroquine- and pyrimethamine-salt mixtures to volunteers has given encouraging results.[2]

Southern Rhodesia is one of the countries where it has been possible to abandon systematic insecticide spraying and to replace it by "barrier-ring" spraying along certain frontiers. To supplement this measure, chloroquine was distributed to the population in some of the peripheral areas. W. Alves discusses the results of sample surveys made in the country and the measures taken to

[1] A summary of this paper appeared in *Chron. Wld Hlth Org.*, 1958, **12**, 193.

[2] A summary of this paper appeared in *Chron. Wld Hlth Org.*, 1958, **12**, 205.

prevent the re-introduction of infection, such as the administration of antimalarial drugs to immigrant workers coming from infected areas.

The vector of onchocerciasis in Kenya had for a long time defied attempts to eradicate it. The main reason for this was that one stage in its life cycle had escaped notice, for it was not until 1950 that the phoretic association between the larvae of *Simulium neavei* and a certain freshwater crab was discovered. This enabled the breeding grounds to be tracked down; and the measures subsequently adopted have proved so efficacious that eradication of the fly may now be considered to be practically complete. J. P. MacMahon, R. B. Highton & H. Goiny describe the various stages of the campaign and the techniques used, with an indication of the cost of the operations.[3]

Vaccination against whooping cough has now been practised sufficiently long for its efficacy to be beyond reasonable doubt, but it is not without its dangers. W. Charles Cockburn discusses the various cases of encephalopathy reported in the literature and assesses the chances of provoking acute attacks of poliomyelitis under certain conditions.[4]

Continuing their studies on dried smallpox vaccine, carried out under the auspices of WHO, R. M. Cross, C. Kaplan & D. McClean have tested the efficacy of a vaccine whose potency—measured in terms of the number of infective units per millilitre—had been reduced below the normal value. One year after vaccination, the immunity provoked by this material could not be distinguished from that conferred by a more potent vaccine. In addition, the level of immunity was the same whether dried vaccine or glycerinated lymph was used.

Research on the virus of trachoma has not progressed as rapidly as that on other viruses. It is difficult to grow in tissue culture and a suitable animal has not yet been found for laboratory studies. In a detailed review of the subject, P. Thygeson discusses the advances in knowledge that have been made, despite these difficulties, concerning the nature of the virus, methods of culture, the pathogenesis of trachoma, and microscopical or clinical diagnosis in the animal.

A paper prepared by R. E. O. Williams in collaboration with other experts deals with the laboratory diagnosis of streptococcal infections, especially infections caused by *Str. pyogenes* which have a tendency to appear in " epidemic " form. A number of techniques and diagnostic tests are recommended. This study is the third in a series on the laboratory diagnosis of various diseases which it is hoped to publish later in monograph form.

Two articles and three notes are devoted to the subject of brucellosis. L. M. Jones discusses methods of preparing nonspecific sera for typing brucella cultures; and, in collaboration with W. Bruce, the same author describes a technique of typing based on a modification of the precipitin reaction in which the antigen is allowed to diffuse into agar plates. The notes deal with immunization against human brucellosis using ether-killed cultures of *Br. abortus* (I. Live); the culture of brucella, including fastidious types, on a selective medium (L. M. Jones & W. J. Brinley Morgan); and a comparison between veal infusion and trypticase-soy broths for the isolation of *Br. abortus* from the blood of cattle (C. A. Manthei, T. E. Amerault & E. R. Goode). The last contribution is a short note describing a method by which it is possible to stain filarial larvae in the body of the insect vectors before dissection (G. S. Nelson).

The list of contents will be found in the advertising section at the end of this number of the Chronicle.

International Standards for Drinking-Water, Geneva, 1958, 152 pages. Price: £1, $4.00, or Sw. fr. 12.—. Also published in French.

That water intended for human consumption must be free from chemical substances

[3] A summary of this paper appeared in *Chron. Wld Hlth Org.*, 1958, **12**, 160.

[4] A summary of this paper appeared in *Chron. Wld Hlth Org.*, 1958, **12**, 79.

and micro-organisms in amounts which would provide a hazard to health is universally accepted. Supplies of drinking-water should not only be safe and free from dangers to health, but should also be as aesthetically attractive as possible. Absence of turbidity, colour and disagreeable or detectable tastes and odours is important in water-supplies intended for domestic use. The location, construction, operation and supervision of a water-supply—its sources, reservoirs, treatment and distribution—must exclude all potential sources of pollution and contamination.

Some countries have established standards of quality which are applicable to their respective areas and have developed a certain degree of uniformity in methods of water analysis and in the expression of the results. Other countries, however, lack official or recognized standards of water quality and have no accredited procedures for the examination of water to assess its quality and safety. During regional and international conferences sponsored by the World Health Organization, the problems of standards of quality for a safe and acceptable water-supply, and of accredited or approved methods for the examination of water, have been fully discussed by groups of expert hygienists and engineers. Great improvement in water quality can be achieved throughout the world if various treatment processes are made easily comparable by the adoption of uniform methods for the examination of water and for the expression of the results. Furthermore, outbreaks of water-borne disease could be avoided through stricter control by the responsible water-supply and health authorities of the quality of water distributed for drinking purposes. The World Health Organization has therefore published a study on the subject, prepared in collaboration with Member States and with the assistance of a number of experts, in an effort to offer technical guidance to health and sanitation administrations wishing to revise their regulations on water-quality control.

Although this new WHO publication may be of assistance to operators of water-supplies and others involved in the treatment and distribution of water, it is intended primarily for the health authorities whose task it is to ensure that the supplies of water which reach the public are safe and potable. The standards with which it is concerned are the minimum standards of chemical and bacteriological quality required of public supplies of water for domestic use.

Conditions differ widely throughout the the world. Some countries are fortunate in having an abundant supply of water from deep wells and underground springs, while others must make extensive use of rivers, lakes and other sources of surface water. It is felt, however, that the recommendations made in the WHO study should be applicable whatever the original source of the water or its treatment may be.

The four principal parts of the study deal with bacteriological, chemical and physical, biological, and radiological requirements. In Part 2, on bacteriological requirements, consideration has been given to the choice of organisms that should be used as indicators of pollution; to methods that it is suggested should be used for the detection of these organisms; to standards of bacteriological quality that might reasonably be established for communal drinking-water supplies; to the frequency with which samples should be taken for bacteriological examination; and to the precautions that should be observed in the collection, storage and transport of samples for bacteriological examination. Details of the technical procedures and tables required for computation of "most probable number" values are included as annexes.

In Part 3, on chemical and physical requirements, attention has been devoted primarily to the limits of concentration for certain toxic substances which may constitute an actual danger to health. Consideration has also been given to the approximate critical concentrations at which other chemical substances may affect the health of the consumer. Chemical substances which affect the quality and acceptability of water have been listed in permissible and excessive concentrations. These substances are not necessarily a menace to the physical well-

being of the consumer, but they render the water aesthetically undesirable for domestic use or cause trouble in the distribution system. The additional chemical substances that provide ancillary indication of pollution are also given. Methods for the analysis of water to detect these chemical constituents of water are given in detail in an annex.

In Part 4, biological requirements relating to studies of water quality, including their use in the detection of pollution, are discussed in general. Technical procedures are described in an annex. Part 5, on radiological requirements, deals with the problem of pollution of water by radiological wastes and the standards of radio-activity which may be tolerated in water intended for domestic use. The important question of laboratory services in the control of water quality is also discussed.

Annual Epidemiological and Vital Statistics, 1955, Geneva, 1958, 699 pages. Price: £3, $12.00, or Sw. fr. 36.—. Bilingual edition (French and English).

The World Health Organization has just published its eighth annual volume of vital and health statistics containing information relating to the various countries of the world for the year 1955.

This publication increases in size with each succeeding year and its scope is continually enlarged to permit a more thorough analysis of the various factors influencing public health. Thus the new report, running to some 700 pages, includes, in addition to the subjects usually covered, detailed specific death-rates, by sex and by age, for malignant neoplasms classified by their principal sites (lungs, digestive organs, breast and genital organs, lymphatic and haematopoietic tissues). It has been possible to give statistics of causes of death for several countries not previously included, and the work also presents, for the first time, a type of information hitherto unobtainable—namely, the distribution of cases of communicable disease by sex and age.

The third part of the volume, dealing with the numbers of health personnel, with hospital establishments and with vaccination against certain communicable diseases, is particularly instructive.

In short, this report—to an even greater extent than its predecessors—enables the reader to form an idea of the variety of factors affecting health in different parts of the world.

CORRIGENDA

Vol. 11, No. 12

THE FILARIASES

Page 366, left-hand column

delete last sentence

insert Man is thus the only reservoir of infection in the case of *W. bancrofti*, but it has been reported that *W. malayi* has also been found in various animals.

Page 366, right-hand column, line 15

delete parasites

insert mosquitos

Page 366, right-hand column, line 34

delete Australia

Page 366, right-hand column, line 35

delete New Zealand

insert New Guinea

BILHARZIASIS

Introduction

Distribution of the intermediate hosts of bilharziasis in relation to hydrography: with special reference to the Nile Basin and the Sudan—*Emile Abdel Malek*

Bilharziasis in Swaziland—*R. J. Pitchford*

Rythmes biologiques des mollusques vecteurs des bilharzioses: facteurs saisonniers et climatiques influençant le cycle de reproduction de *Bulinus truncatus* et de *Planorbarius metidjensis* en Afrique du Nord—*J. Gaud*

Some aspects of snail ecology in South Africa: a preliminary report—*B. de Meillon, G. H. Frank & B. R. Allanson*

Factors conditioning the habitat of bilharziasis intermediate hosts of the family Planorbidae—*Emile Abdel Malek*

The ecology of *Australorbis glabratus* in Puerto Rico—*Harold W. Harry & David V. Aldrich*

Ecology and distribution of *Bulinus truncatus* in the Middle East: with comments on the effect of some human activities in their relationship to the snail host on the incidence of bilharziasis haematobia in the Middle East and Africa—*J. M. Watson*

Studies of the snail vectors of bilharziasis mansoni in north-eastern Brazil—*Frederico S. Barbosa & Louis Olivier*

Le complexe « mollusque-schistosome » au Brésil—*A. Buttner*

Non-human vertebrate hosts of *Schistosoma haematobium* and *Schistosoma mansoni*—*A. Vianna Martins*

The intradermal test in the diagnosis of bilharziasis—*J. Pellegrino*

Field trials of various molluscicides (chiefly sodium pentachlorophenate) for the control of aquatic intermediate hosts of human bilharziasis—*Willard H. Wright, Charles G. Dobrovolny & Elmer G. Berry*

Bilharziasis control by application of molluscicides: a review of its present status—*Ernest Paulini*

Lucanthone hydrochloride: a review—*D. M. Blair*

Relation between irrigation engineering and bilharziasis—*Joseph N. Lanoix*

Comments on the epidemiology and control of bilharziasis—*Donald B. McMullen & Harold W. Harry*

Notes

BULLETIN OF THE WORLD HEALTH ORGANIZATION

Vol. 18, No. 5-6, 434 pages

Price: £1; $4.00; Sw. fr. 12.—

COMMUNICABLE DISEASES

Introduction

La fièvre jaune dans la Fédération d'Ethiopie et d'Erythrée: nouvelles données épidémiologiques—*M. A. Chabaud & M. Ovazza*

Diarrhoeal disease with special reference to the Americas—*Louis J. Verhoestraete & Ruth R. Puffer*

Chloroquine or pyrimethamine in salt as a suppressive against sporozoite-induced vivax malaria (Chesson strain)—*G. Robert Coatney, Olaf Mickelsen, Robert W. Burgess, Martin D. Young & Carl I. Pirkle*

Malaria parasite rates in Southern Rhodesia: May-September 1956—*William Alves*

The eradication of *Simulium neavei* from Kenya—*J. P. McMahon, R. B. Highton & H. Goiny*

Incidents et accidents consécutifs à la vaccination anticoquelucheuse—*W. Charles Cockburn*

Studies with dried and glycerinated smallpox vaccines of full and diminished potencies—*R. M. Cross, C. Kaplan & D. McClean*

The present status of laboratory research in trachoma—*Phillips Thygeson*

Laboratory diagnosis of streptococcal infections—*R. E. O. Williams*

A recommended method for the preparation of monospecific brucella sera—*Lois M. Jones*

The use of gel diffusion precipitin plates in the study of brucella—*W. Bruce & Lois M. Jones*

Notes

Immunization studies on human volunteers with ether-killed *Brucella abortus*: preliminary report—*I. Live*

A preliminary report on a selective medium for the culture of brucella, including fastidious types—*Lois M. Jones & W. J. Brinley Morgan*

Comparative efficacy of trypticase-soy and veal infusion broths for isolating *Brucella abortus* from the blood of cattle—*C. A. Manthei, T. E. Amerault & E. R. Goode*

Staining of filarial larvae in insects before dissection—*G. S. Nelson*

Bibliographical section

Quarantinable diseases

BULLETIN OF THE WORLD HEALTH ORGANIZATION

Vol. 19, No. 1, 222 pages

Price: 10/-; $2.00; Sw. fr. 6.—